

# THE DOCK & HARBOUR AUTHORITY

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JUNE, 1929.

## Editorial Comments.

### PROPOSED NEW FISH DOCK FOR GRIMSBY.

The Port of Grimsby, which is situated at the mouth of the Humber and in close proximity to the Port of Hull, is well-known as a base for fishing trawlers. At the present time the accommodation for these trawlers comprises two docks, but owing to the increased number of trawlers which are making this port their base, it has been found necessary to construct a new fish dock, and this forms the subject matter for this month's Supplement.

The new fish dock is to be constructed adjoining the two present docks, and was first considered in 1912, but the war naturally caused a certain amount of delay. The Grimsby Corporation are to construct the dock, which will cover an area of roughly 37 acres, and is to be leased to the London and North-Eastern Railway Company for a period of 30 years.

On the completion of this undertaking, the estimated cost of which is £1,418,000, the extra accommodation available for trawlers should give a great lift to Grimsby fishing industry.

An article giving full details of this proposed new fish dock, together with photographs and plan, will be found on another page in this issue.

### THE NEW WELLAND SHIP CANAL.

Through the courtesy of the High Commissioner for Canada in London, we are able this month to publish particulars of the new Welland Ship Canal, together with photographs.

The old Welland Ship Canal was opened in 1829, but in recent years, owing to the increased size of the grain-carrying vessels, it has been found necessary to build a larger canal.

Previously, the grain-carrying vessels had to unload their cargoes at Port Colborne, from whence they were trans-shipped to smaller vessels which could negotiate the canal.

The new and larger canal was commenced in 1913, and it is expected will be completed next year. The total cost is estimated at about 115 million dollars.

### INCREASED TRAFFIC AT SAINT JOHN, NEW BRUNSWICK.

During the fiscal year 1928-29, the Port of Saint John, N.B., handled a total outward-bound cargo of 1,277,466 tons, an increase during the twelve months of 205,057 tons, and within 51,000 tons of the record total of 1919-20.

The number of vessels leaving and entering, including the sub-ports of St. Martin's, Beaver Harbour and Chance Harbour, was:—Coastwise, inward, 1,949, tonnage 400,442; outward 2,112, tonnage 713,914; total vessels 4,061, total tonnage 1,114,356. For the fiscal year ended 1927-28 the total was 3,753, and the tonnage 1,044,848.

The number of vessels cleared for sea was: In cargo 868; registered tonnage, 1,054,554; in ballast 194; tonnage 108,839. In addition 88 vessels cleared for Halifax with part cargoes, carrying from Saint John 166,847 tons of freight. The 868 vessels were destined for 16 different countries and carried cargoes totalling 1,277,466 tons.

### COLOMBO PORT'S EXPENDITURE FOR 1928-29.

In view of the present unsatisfactory financial position of the island it has been decided by the Colombo Port Commission to keep, as far as possible, the demands for non-recurrent expenditure in the Budget of 1929-30 within the sum of Rs.800,000, or thereabouts, at the same time pointing out to the Government the insufficiency of the sum to meet the non-recurrent expenditure of the Port Commission in future years.

The following are some of the approved estimates of the Colombo Port for the financial year 1928-29: (1) Rs.62,353 for building twelve special quarters at Bloemendahl for

artisans and nine quarters at Kolonnawa for coolies to provide the necessary drainage and water service, and to fill up and level an area of swamp land at Bloemendahl for further houses. (2) Rs.56,000 for the necessary alterations to the area round the new Customs House at the Passenger Jetty. (3) Rs.3,000 for laying an extra siding at the Chalmers Quay.

### TYNE IMPROVEMENT COMMISSION.

A very attractive and interesting pamphlet has just been issued by the Tyne Improvement Commission, entitled the River Tyne. In the pamphlet there are three plans showing the position of the various firms carrying on business on the River Tyne. Copies of this pamphlet can be had on application to the Tyne Improvement Commissioners.

### BOMBAY PORT TRUST.

At a meeting of the Bombay Port Trust held recently, the following estimates of expenditure were considered and sanctioned: (a) Rs.66,000 for special repairs to hydraulic cranes in the docks during 1929-30. (b) Rs.26,000 for providing a further 50 Port Trust railway wagons with steel floors in accordance with the programme provisionally approved. (c) Rs.5,754 for improvements to the drainage system in certain grain depot sheds. (d) A supplementary estimate amounting to Rs.6,890 for raising certain plots at the manganese ore depot. (e) A supplementary estimate of Rs.8,000 for repurchasing from Government a small plot of land at Carnac Bunder Siding Road relinquished by the Postal Department.

The tender of Messrs. Balmer Lawrie and Co. for supplying and delivering the corrugated galvanised sheeting and fittings required for roofing over the extension of "B" shed grain depot, amounting to Rs.22,707, was accepted.

A lease of a plot of land measuring 10,000 square yards at Wadala was granted to Messrs. Mawson Vernon and Co. for asphalt refinery works.

### FUTURE OF MORPETH DOCK.

Apart from the filling in of the Clarence Dock, Liverpool, one of the lesser docks on the Birkenhead side of the Mersey Dock estate is to be closed. This is a branch from the Morpeth Dock, and was used for years by the Great Western Railway Co. for the transference of goods by barges from Birkenhead to Liverpool. Owing to the improvement of motor transport, however, the dock has not been used so frequently in recent years. The filling in of the dock is in connection with the railway company's extension scheme. The scheme will involve the expenditure of about £150,000 eventually, but this will be spread over a period of two or three years. Originally it was intended to empty the dock and convert it into an underground depot for the storage of goods, but this proposal has been abandoned, and it is now the intention to fill the dock in and to construct goods sidings and warehouses on the site.

### RIVER DEE NAVIGATION.

Plans are under consideration for the deepening of the River Dee waterway. At the annual meeting of the Joint Board of the Chester Port Sanitary Authority, the River Inspector said he understood the Dee Conservancy Board had a scheme afoot for deepening the river and this would undoubtedly induce greater tonnage, and more vessels could come over the river. The Chairman, Mr. Joseph Forber, announced that the scheme had not yet been officially before the Dee Conservancy Board, and he did not know whether they would be justified in speaking about it beyond suggesting that any steps which were likely to be taken with a view of improving the river would be welcomed. No real industrial developments along Deeside would materialise until they had a navigable river.

## Port of Southampton Topics.

### A FLOATING DOCK OCCASION.

The 60,000 ton floating dock owned by the Southern Railway and forming one of the chief amenities of Southampton as a port, will be used on June 30th or July 1st for the accommodation of the new German liner "Bremen." This will be the first occasion on which the dock has been used by a foreign vessel of any description, and the advent of the liner can certainly be regarded as a triumph for the facilities Southampton has to offer. Unusual interest is being taken in the docking of the "Bremen" for the reason that the bows of this 46,000 ton vessel are of an unconventional design and will require adjustment of method for the operation. The purpose of the docking is for the vessel to have the finishing touches put to her under-water portions, and it is expected that she will be laid up for three days. It seems likely that as the number of competitors on the Atlantic service increases, more liners from abroad may use Southampton's "floater," being as it is within convenient reach when others are occupied. Recently the dock underwent renovation and her bed was re-dredged, thousands of tons of spoil being removed.

### ADVERSE STATISTICS.

The current statistics for the docks published by the Southern Railway Co. show big decreases of both inward and outward tonnage for April, compared with the corresponding period last year. While the number of vessels inward increased from 271 to 276, and the outward from 262 to 281 (five inward and 19 outward) the gross inward tonnage fell from 1,432,192 to 1,346,587, a decrease of 85,605. There was also a fall of 82,238 outward (1,361,295 as against 1,443,533). The net tonnage likewise showed decreases, the inward figures being 728,705 against 774,912, a difference of 46,207, and the outward 726,922 against 773,168, a difference of 46,246.

Under four headings only are increases recorded. Cargo returns decreased by 9,886 tons inwards, the figures being 48,171 and 58,057. Outward there was an increase of 6,797 from 36,643 to 43,440. Passenger figures are down by 207 inwards and 1,704 outwards. Aggregates for the month were 18,114 inward as against 18,321 in April last year, and 17,529 outwards compared with 19,233. There was some advance in the number of troops passing through the port, for although the inward total fell by 1,168 to 6,010, the outward total was 1,513 compared to none during the same period in 1928.

### THE AMERICAN INVASION.

During the 31 days of May, 82 liners cleared from Southampton for ports overseas, and 54 arrived from long voyages. This signifies that four or more large passenger ships are using local facilities every day. During the course of the month there were 18 arrivals from, and 37 sailing for, New York on the schedule. In fact, there were only six days on which there was not either an arrival or a departure of trans-Atlantic liners. The season for the annual visitation of thousands of American tourists has thus commenced and will continue right until the end of the autumn.

### BOARD OF TRADE OFFICER RETIRING.

Captain J. King, O.B.E., R.D., R.N.R., principal officer to the Board of Trade at Southampton, retires on June 1st, after serving in that capacity for the past eight years. At a luncheon held on May 27th he said that he thought of retirement with mixed feelings, for on June 12th he celebrates the 50th anniversary of his first voyage as an apprentice.

## Scottish Harbour Notes.

### PORT GLASGOW SHIPYARD SOLD.

Messrs. James Lamont and Co., ship repairers, Greenock, have purchased the shipyard of the Clyde Shipbuilding and Engineering Co., Port Glasgow, which has been closed for some time. The purchase includes the engineering works, but not the foundry.

Messrs. Lamont at present carry on business at the dry dock at the East India Harbour, Greenock, and the Port Glasgow yard has been acquired for an extension of that business. The yard will be entirely devoted to repair work, and an additional hauling-up slip is to be laid down immediately.

### INADEQUATE PIER ACCOMMODATION AT KIRKWALL.

The volume of shipping business at Kirkwall has increased in volume so greatly during recent years that the pier accommodation, particularly on the west side, has become quite inadequate.

The Orkney Harbour Commissioners have had the question of extending the surface area of the pier under consideration, and at a meeting at Kirkwall it was agreed to widen the pier to the extent of 24-ft. from the north-west corner of the present pier to the existing stairs on the west side, and from these stairs to the corner of the cross berths to the extent of 12-ft.

The cost of the proposed extension will involve an expenditure of several thousand pounds.

### NEW CLYDE PLEASURE STEAMER QUAY COMPLETED.

The building of the new bridge over the Clyde which was completed in the early months of last year resulted in the demolishing of the Broomielaw pleasure steamer quay and waiting rooms. New accommodation has, however, been provided on the south side of the Clyde at the southern end of the King George V. Bridge, and the Clyde Trust workmen have been engaged on the new berthage for the past six months. Steamers used this for the first time on the King's Birthday Holiday, when thousands of Glasgow's river pleasure trippers embarked for a day's outing to the coast. The accommodation provided is on a very extensive and elaborate scale, and are a notable addition to the Glasgow Harbour facilities, which should increase the popularity of passenger steamer traffic between Glasgow and the coast towns.

The structure is of terra cotta brickwork faced with red freestone, and is divided into two portions, allowing ample berthage for three passenger steamers.

The western portion contains the shipping companies' offices, porters' room, and spacious sheds for the extensive goods traffic which runs in conjunction with the summer holiday service. In the eastern portion there are bright, airy waiting-rooms, baggage rooms, stores, and deputy harbour master's office.

Externally, the building is pleasing to the eye, the entire frontage being attractively embellished with tasteful ornate work. A long verandah, with a glazed roof and supported by ornamental brackets, runs the full length of the structure, which both adds to the appearance of the building and at the same time provides a good shelter for queues during wet weather.

The old clock-tower which presided over the old building and had become an historic landmark, was carefully removed from its old resting place, and now adorns the new premises.

It is expected that the change-over from the north to the south side of the river will afford the authorities a better opportunity of regulating traffic on the approaches to the river.

## Port Dues in Yugoslavia.

### Prevailing Rates of Exchange.

The Department of Overseas Trade has received from the Commercial Secretary at Belgrade the following list of official rates of exchange for the payment of port dues in Yugoslavia during the month of May, 1929, which have appeared in the "Official Gazette" of May 1st:—

	Dinars.
1 Gold Napoleon	218.00
1 pound sterling	276.30
1 American dollar	56.85
1 Canadian dollar	56.55
1 German mark (gold)	13.50
1 Belga	7.90
100 French francs	222.30
100 Italian lira	298.00
100 Dutch florins	2286.00
100 Danish crowns	1515.30
100 Swedish crowns	1518.00
100 Norwegian crowns	1516.00
100 Pesetas	835.00
100 Greek drachmas	73.65

Personal enquiries regarding shipping and transport matters should be made at the City office of the Department (Shipping and Transport Section), 73, Basinghall Street, London, E.C.2.

### CUSTOMS DUTY ON POPPIES.

The Customs duty on poppies imported to Ceylon for sale in aid of the Poppy Day Fund has been abolished as from March this year, with the sanction of the Finance Committee of the Ceylon Legislative Council.

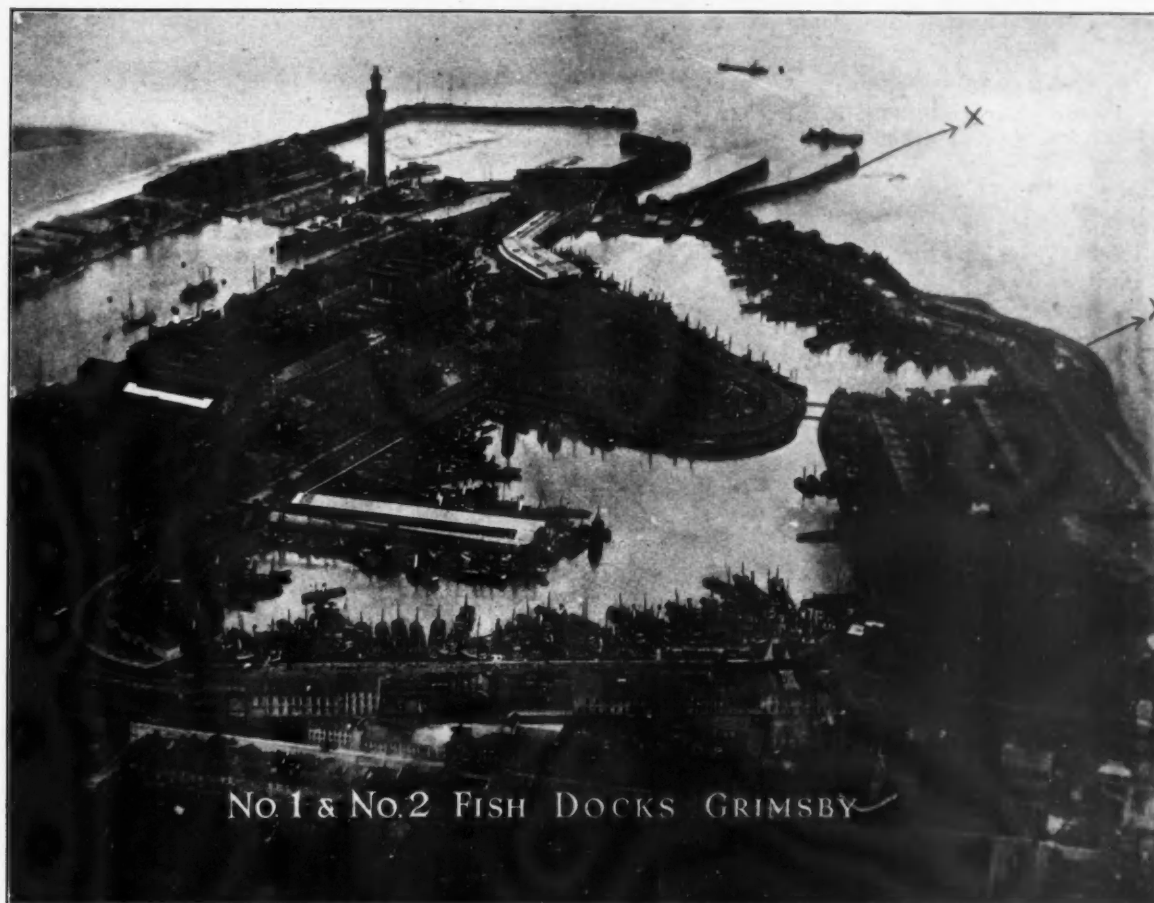
### KUSTEN CANAL, GERMANY.

According to recent reports, expenditure on this canal up to date was 19 million marks; one-third of this has been found by the State of Oldenburg.

The portion between the Oldenburg frontier and Bockhess-terstrasse will be finished in the near future; the sections that are furthest away from occupied districts will be the first to be finished. Difficulty has been experienced in obtaining sufficient and suitable labour.

At Sedelsburg and Elizabethfehn several factories will be erected as soon as the canal has reached that district. A peat moss litter factory that has been closed down was recently bought by a Dutch concern which will, in addition to peat moss, manufacture starch and potato flakes.

## Proposed New Fish Dock for Grimsby.



Aerial View depicting the position of the proposed new Fish Dock. The crosses in top right hand corner show where the new Dock will join up with No. 1 Fish Dock. The Tower in the top left hand corner is the Royal Dock Hydraulic Tower, which immediately overlooks the Royal Dock and the Royal Dock Basin.

**T**HE Grimsby Corporation (Dock, etc.) Bill received the Royal Assent on Friday, May 10th, and it is hoped that the first sod will be cut within the next few months. The new Fish Dock when completed will result in a boom of the Port's staple industry which has been working under cramped conditions for many years. Not only has the Grimsby fleet grown year by year as to severely tax the berthing accommodation in both the present docks, but her markets have attracted a large number of foreign fishing vessels which daily come and land their catches. But for the intervention of the war the dock might have actually been a material fact, for as far back as 1912 the old Great Central Railway Company promoted a Bill in Parliament for the construction of a new fish dock. At the conclusion of the war, so great had the need for a new dock grown, that the Railway Company were approached with a view to their Bill being again pushed on with. However, the material changes which had taken place during those intervening years had made the project almost prohibitive, and it was in these terms that the Railway Company replied to the representations which were made to them. They (the Company) pointed out that whereas in 1912 the cost of constructing a dock would have been about half a million the cost had risen to about 1½ millions and as a consequence they did not consider it was an economic proposition and one with which they could proceed. Despite this reply the Grimsby Corporation, along with the trawler owners, kept on pressing the Railway Company for something to be done to alleviate the position, and towards the end of last year the matter entered upon a new phase. The Railway Company suggested to the Corporation that if they built the dock, borrowing money for the purpose, the Railway Company would undertake to repay by annual instalments such amounts equivalent to the loan and the necessary charges, and when all payments had been made the Company would take over the dock from the Corporation. In short, the Railway Company were to take over the dock from the Corporation without the scheme having cost the Corporation or the ratepayers one penny. Previous to this proposition being put to the Corporation, the latter, with a view to pushing on matters and assisting the Railway Company, had made every endeavour to obtain a grant for the Railway Company, but the Government viewed the Company as a revenue producing concern and refused to sanction a grant. Ultimately a way out of the difficulty came in the shape of the late Government's decision to grant loans for

schemes to assist unemployment and the absorption of unemployed from distressed areas. Under this the Bill was promoted by the Grimsby Corporation and between the Town Clerk (Mr. J. W. Jackson) and the then Borough Member (Councillor Walter J. Womersley) the Bill and all its necessary work was successfully engineered.

The Bill empowers the Corporation to construct a dock and other works, including a road from Humber Street over the railway on to the new dock land, and to equip the dock for public use. The approximate water area of the new dock will be 37 acres, and there will be provided slipways and jetties for refitting, and special coaling appliances. On the North side will be a quay 2,200-ft. long. The new dock will adjoin the existing No. 1 Fish Dock, and the major portion of what is known as Campbell's Jetty will disappear, and thus a total water area of 50 acres will be given. On the river side of the works a huge river wall will be built. This will extend from a point between the Suggitt's Lane crossing and the Fuller Street Bridge to the entrance of the new fish dock, which will adjoin the existing entrance to the fish docks. The construction of this sea wall will make possible the reclamation of a large area of land which will be available for industrial development, in addition to new railway sidings and necessary dock equipment. The railway sidings will provide for thousands of trucks, while the scheme provides for up-to-date coal drops fed directly from spacious sidings. The present sewer outfall will be diverted by means of a 7-ft. 6-in. sewer culvert to the river wall, and the sewage will then be conveyed a further distance of 350 yards beyond the wall by means of two cast iron sewers each 5-ft. 4-in. in diameter. The fresh water will be dealt with by means of a 6-ft. culvert from the present fresh water outfall to the river wall. This culvert will also be utilised to take water from the graving docks.

The estimated cost of this work is £1,418,000, but the limit of the money to be found by the Corporation is £1,250,000, any further money required to be provided by the L.N.E.R. Co. Some of the details of how this big sum is made up are as follows:—For the purchase of land, £30,000; for the construction of the river wall £89,710; for the construction of the dock, entrance channel and the works and conveniences connected therewith, £958,400; for the erection of buildings in connection with the dock, £4,200; for machinery and plant in connection with the dock, £79,965; for the construction of sidings, £98,240; for the construction of piers, £23,885; for

the construction of the sewers and outfall channels, £96,600; and for the construction of the road, £42,000.

The financial aspect of the undertaking hinges upon an agreement arrived at between the Corporation and the L.N.E.R. Co. This agreement provides that when the dock is completed it shall be leased to the Railway Company for a period of 30 years at a rent which shall cover the interest payable by the Corporation on money borrowed in connection with the dock. The capital money expended by the Corporation shall be repaid by the Railway Company in half-yearly instalments, within the period during which the Corporation by the terms of their loan have to repay the sum; or within 35 years from the borrowing; or 30 years from the completion of the work, whichever period is the shortest. The Bill also provides that when the Corporation have borrowed any money the Railway Company shall issue to the Corporation £1,250,000 debenture stock, redeemable by the Company at par, not later than the expiration of 30 years after the completion of the works, such debenture stock to have attached thereto a fixed preferential interest payable half-yearly at the rate of five per cent. By the agreement it is further provided that this interest is only payable in case of default being made by the Railway Company

able sum (not being less than three pence) per gross registered ton of such vessel as the Corporation may think fit.

It will be noted from these conditions and the general usage of employing the big trawlers in the distant fishing that some attempt is being made to frame the scale of charges on the amount of dock accommodation required, and also to provide the means at any rate of giving Grimsby trawlers preference over the occasional visitor. It is also provided that if and when in any year ending on December 31st, the aggregate of the gross registered tonnage of fishing vessels in respect of which tolls, rates, dues or charges were paid for the use of the existing docks in the year ended December 31st, 1927, then and henceforth the addition in the case of fishing vessels within the description of paragraph three mentioned above shall be reduced from three pence to the sum of three halfpence per gross registered ton of such vessel. When the Railway Company have repaid to the Corporation all the money due under the agreement, the dock is to vest in the London and North Eastern Railway Company as part of their undertaking. The agreement between the Corporation and the Railway Company is also subject to the receipt of a grant in aid of the



View of No. 1 Fish Dock, which gives adequate proof of the need of the proposed new Fish Dock.

in repayment of the capital monies as required by the agreement. The rent under the lease is to pay the amount of interest payable by the Corporation on monies borrowed and the Bill provides that such rent shall be entitled to rank in priority to the interest or dividends on mortgages, bonds and debenture stock of the Railway Company. Then in default of payment by the Company as required by the agreement the Corporation will have a right to re-entry to the dock. This refers to both payments in respect of rent under the lease and the sums representing repayment of capital sums, but such re-entry would not terminate the obligation of the Railway Company to pay the money due under the agreement.

One of the conditions of carrying through the scheme was that in consideration of the further accommodation to be provided the trawler owners should agree to pay additional charges. As a result of negotiation between the trawler owners and the Railway Company a clause in the Bill provides that in addition to the charges for the time being in force the following dues shall be paid:—

- (1) A fishing vessel regularly engaged in fishing in the North Sea and using the port of Grimsby as its home port and permanent or principal base, the sum of one half-penny per gross registered ton of such vessel.
- (2) A fishing vessel engaged in fishing in the North Sea and not using the port of Grimsby as its home port and permanent or principal base such reasonable sum (not being less than one halfpenny) per gross registered ton of such vessel as the Corporation think fit.
- (3) A fishing vessel regularly engaged in fishing elsewhere than in the North Sea and using the port of Grimsby as its home port and permanent or principal base the sum of three pence per gross registered ton of such vessel.
- (4) A fishing vessel engaged in fishing elsewhere than in the North Sea and not using the port of Grimsby as its home port and permanent or principal base such reason-

able sum (not being less than three pence) per gross registered ton of such vessel as the Corporation may think fit.

The engineer for the works is Mr. J. A. Wickham, the L.N.E.R. Company's chief engineer for docks, and at present the work of preparing plans and specifications is in hand. Then will follow the invitation of tenders.

The Supplement shows the situation of the proposed new fish docks.

#### BRITISH COLUMBIA POWER DEVELOPMENTS.

Canadian firms are likely to be awarded most of the contracts for the construction of the new \$7,500,000 power plant of the British Columbia Electric Railway Company on the Stave River near Rusk, B.C. Contracts for the first unit to develop 42,500 horsepower at a total outlay of \$680,000 have all been let to Canadian firms.

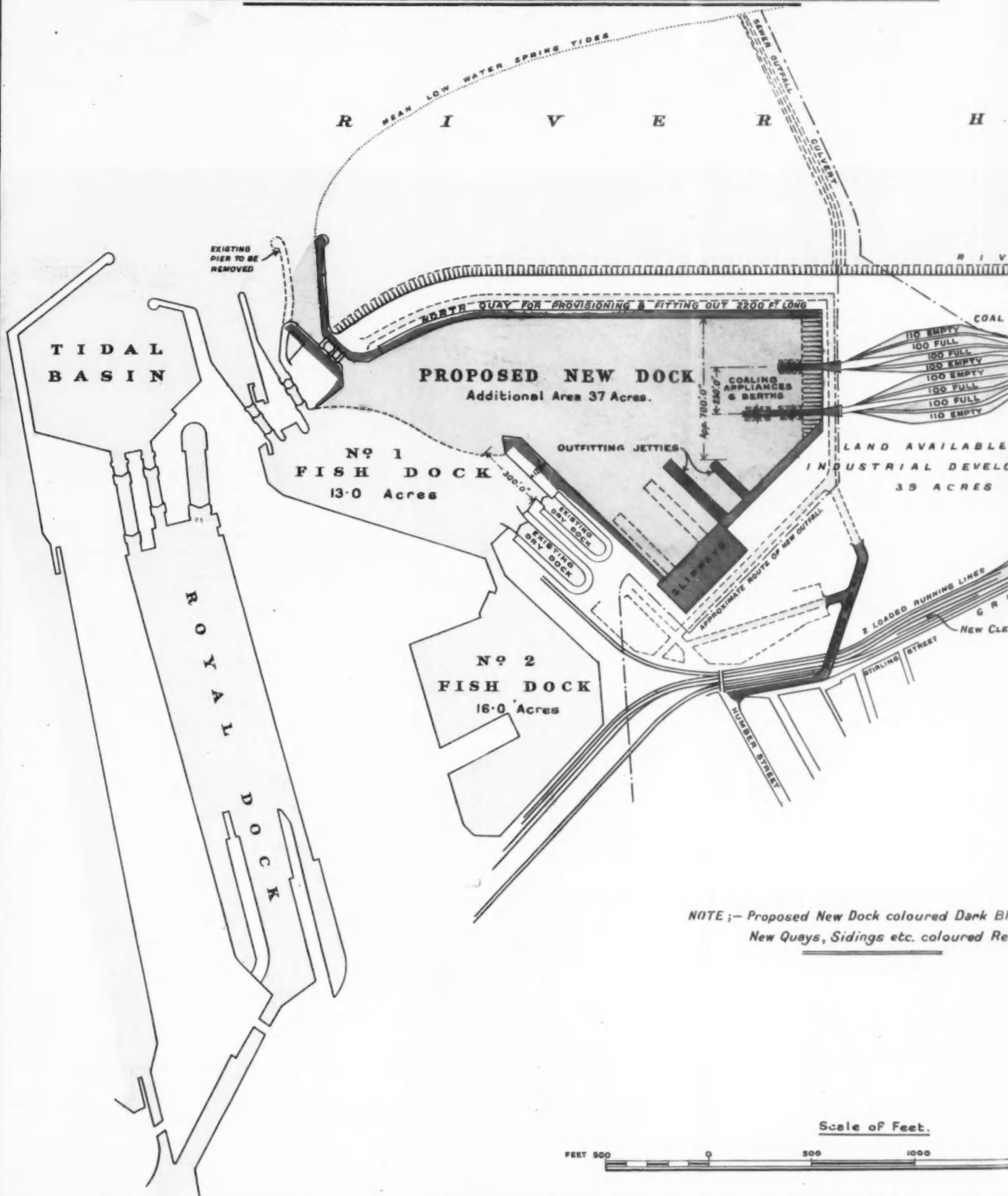
Foundations will be laid for four other units of similar capacity. The Dominion Engineering Works, Ltd., will construct the Hydraulic turbine at its Montreal plant. The Canadian Westinghouse Co., at Hamilton, will build the generator, and the Canadian General Electric Company at Toronto will construct four step-up transformers.

As announced some time ago a contract for the construction of the dam being erected on Stave River in connection with the development was awarded to Messrs. Stuart Cameron and Co., Ltd., and Messrs. Armstrong, Morrison and Co., Ltd., Vancouver, contractors. The contract price was \$892,987. In addition it was estimated that an expenditure of some \$300,000 would be entailed for the cement to be supplied by the B.C. Electric Railway Company.

# PORT OF GRIMSBY.

## PROPOSED NEW FISH DOCK.

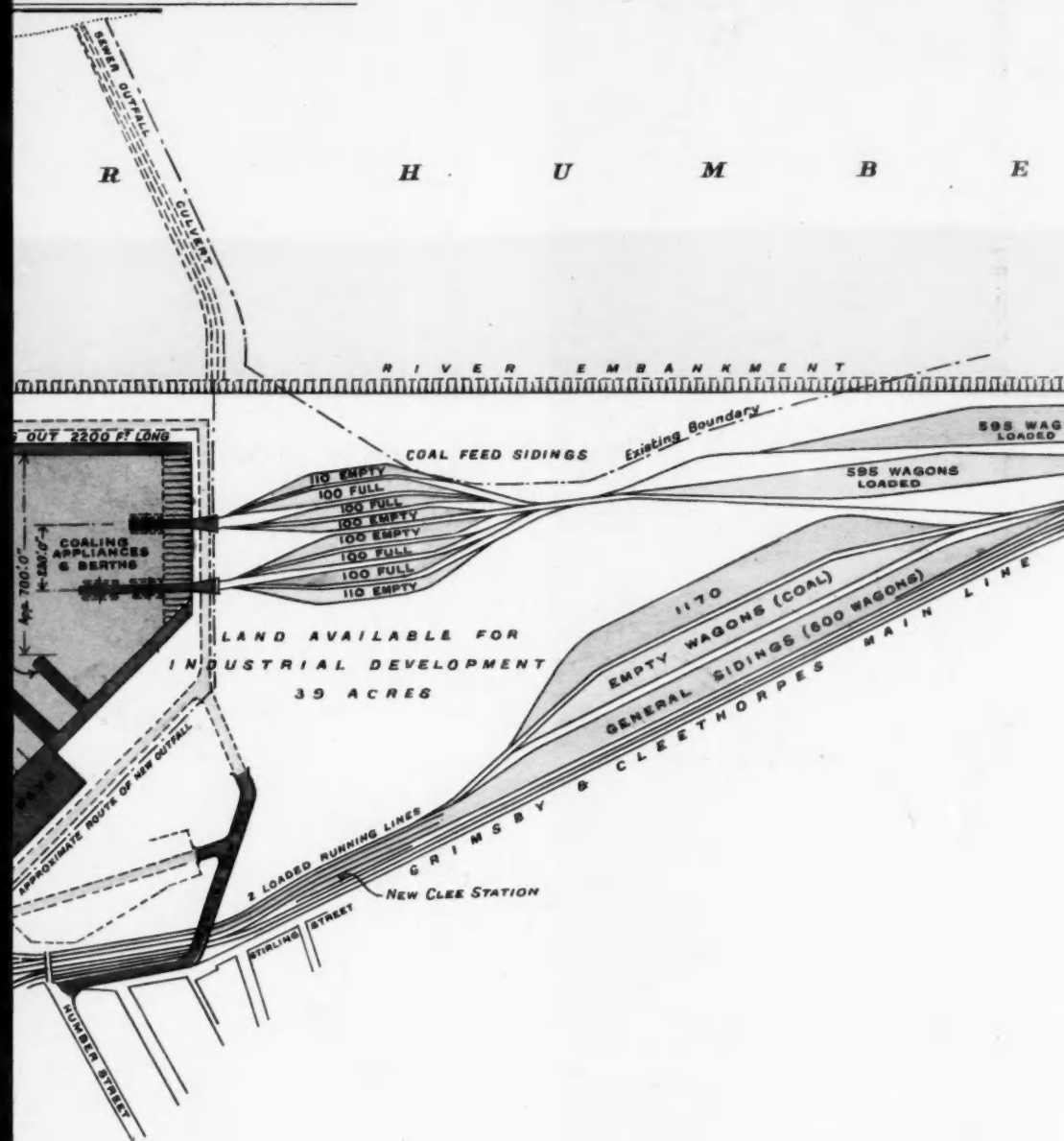
UNDER THE JURISDICTION OF THE LONDON & NORTH EASTERN RAILWAY COMPANY.



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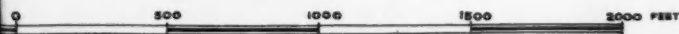
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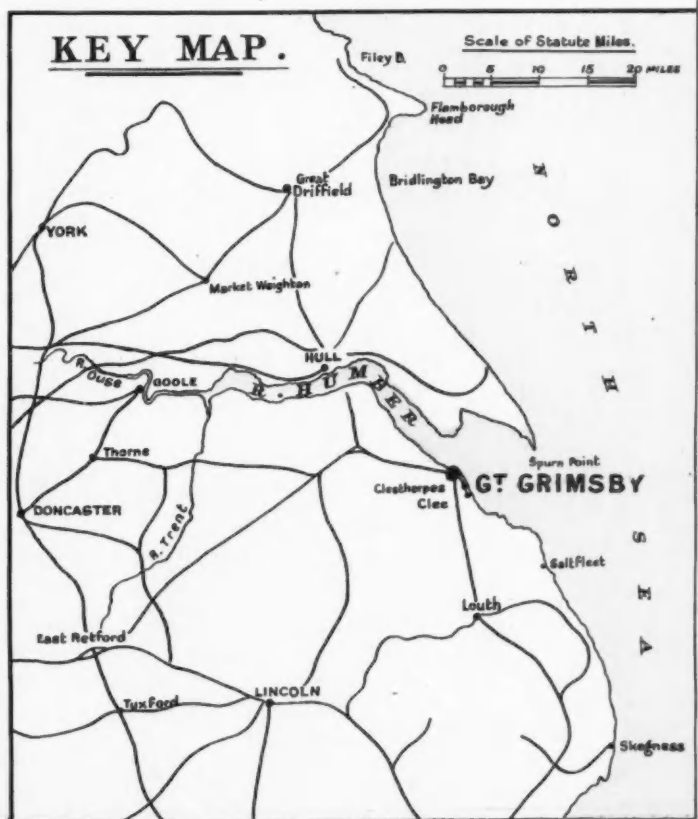
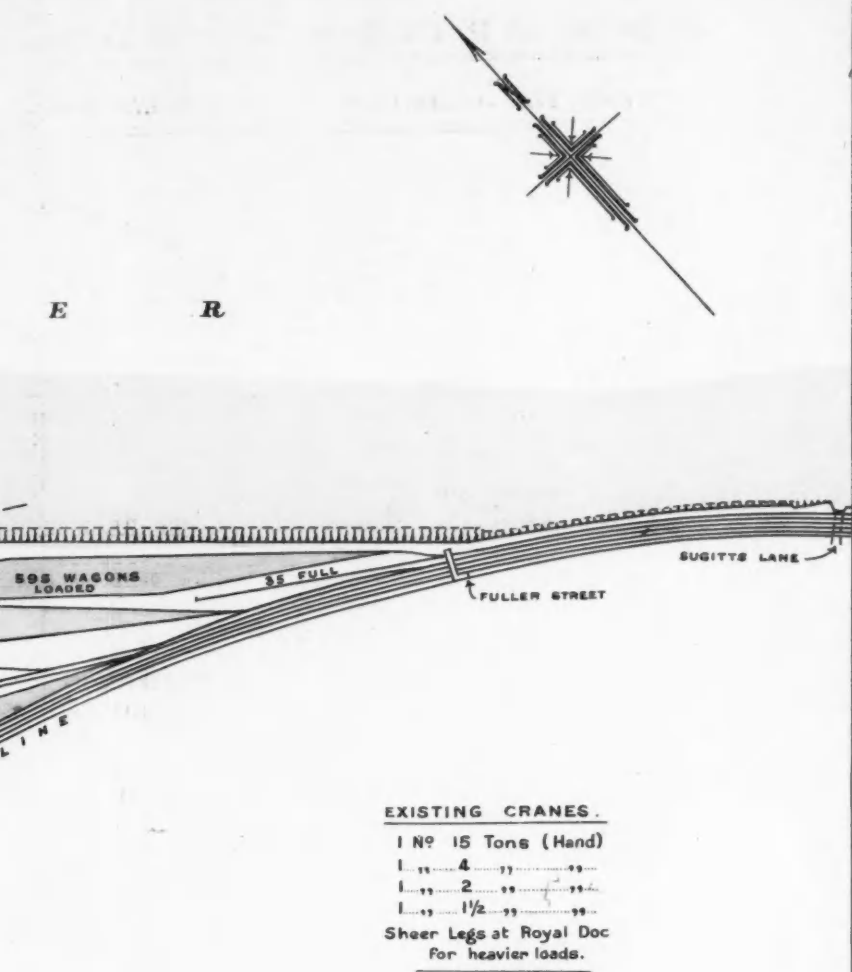


NOTE:—Proposed New Dock coloured Dark Blue.  
New Quays, Sidings etc. coloured Red.

Scale of Feet.



JUNE, 1929.

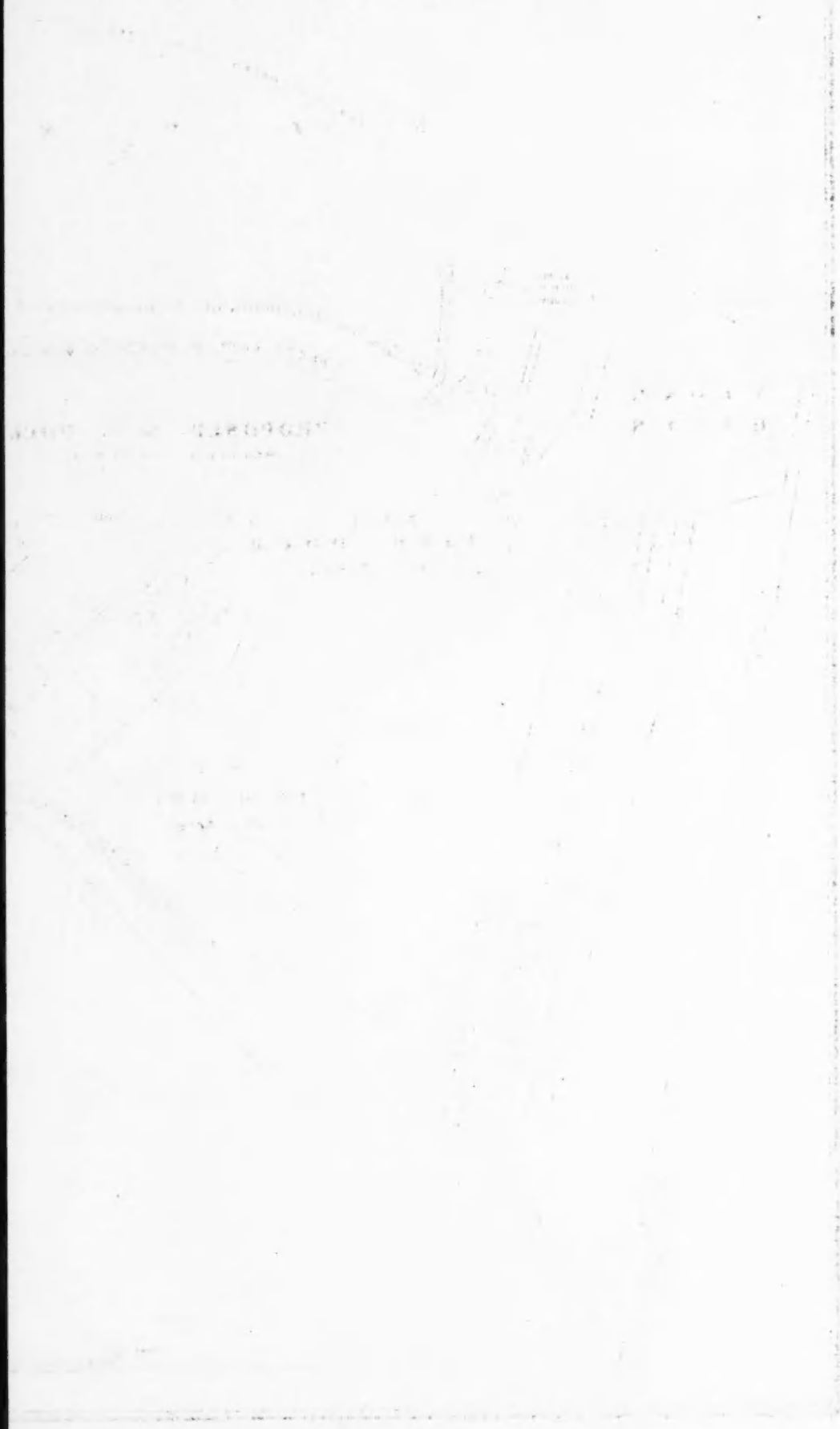


SUPPLEMENT TO THE

# PORT OF CALL

PROPOSED NEW LINE

FROM THE PORT OF CALL TO THE PORT OF CALL



## Wellington Harbour Board.

### Annual Report of the General Manager and Chief Engineer.

The annual report of the General Manager and Chief Engineer (J. Marchbanks, M.Inst.C.E.) on the trade of the Port of Wellington and on the financial results obtained for the year ended 30th September, 1928, and also on the engineering works which have been carried out or are now in hand, is given herewith.

#### TRADE.

There has been a moderate increase in the trade of the Port for the year. Overseas imports from English and Foreign Ports have increased considerably. Cargo from Coastal and Australian ports has decreased slightly, while there has been an increase in general goods transshipments. General cargo outwards has increased to a considerable extent, particularly to British and Foreign ports. There has been a substantial increase in the amount of wool shipped, but hemp shipments have fallen off materially. Butter shows a large increase. Cheese is a good deal less than for the previous year, while frozen meat is nearly the same.

Shipping arrivals have increased by 32,821 tons. The total net registered tonnage of vessels arriving was 3,543,222, as against 3,510,401. The arrivals this year constituted a record for the port. The number of vessels arriving was 3,080, of an average tonnage of 1,150 tons, as compared with 3,107 vessels of an average tonnage of 1,129 tons in 1927. There is a gradual increase in the size of the ocean liners which increases the average tonnage of vessels visiting the port.

The total tonnage of cargo of all classes landed and shipped was 2,171,437 tons, as against 2,075,698 tons last year. Since the last report the practice of taking the manifest tonnage in and out has been adopted. Therefore transshipments are now included in the exports as well as in the imports.

The tonnage of inward cargo, apart from transshipments, was 1,104,707 tons as against 1,006,760 tons for 1926-27, an increase of 94,947 tons or 9.7 per cent.

British and Foreign cargo inwards increased by 92,291 tons. Coastal cargo increased by 22,755 tons, and Australian cargo decreased by 17,099 tons, still due principally to a decrease in the amount of coal imported, which was 14,507 tons less than last year.

Transshipments show an increase from British and Foreign ports of 8,638 tons, from coastal ports a decrease of 10,484 tons, and a decrease from Australian ports of 4,393 tons, the total decrease being 6,239 tons. The decrease from coastal ports is caused by the fact that 24,192 tons less coal was transhipped last year, its place having been taken by fuel oil, of which less is consumed.

The outward cargo shipped from the Port amounted to 444,772 tons, compared with 434,502 tons last year, an increase of 10,270 tons, or 2.4 per cent.

The total exports to British and Foreign ports increased by 2,863 tons, to coastal ports by 871 tons, and Australian ports by 6,536 tons.

The general cargo imports increased from 514,137 tons to 530,684 tons, or 32 per cent. The general cargo transhipped increased from 133,869 tons to 136,901 tons, or 2.3 per cent. The general cargo exports increased from 217,629 tons to 227,857 tons, or 4.7 per cent. There was an increase in the total importations of timber amounting to 3,445,401 super feet, the total inward timber of all classes handled was 27,628,113 super feet, which was 14.2 per cent. greater than for the previous year. The increase is due to the larger quantities of New Zealand timber landed, there having been an increase of 3,635,211 super feet last year.

The exports of timber amounted to a little over one million super feet, and is gradually decreasing.

The total coal received was 367,572 tons, a decrease of 25,142 tons. The decrease is almost entirely due to the lesser amount of coal shipped overseas. There was a slight decrease in the coal landed for public use. Coal received by the Government, exempt from wharfage, was 79,411 tons, a decrease of 3,374 tons.

The tonnage of oils in bulk, including fuel oil pumped ashore, was considerably greater than last year, being 218,812 tons, as compared with 145,610 tons, an increase of 73,202 tons, or 50.3 per cent. Bulk oil outwards was 159,379 tons including 37,740 tons transhipped overseas. The total bulk oil landed and re-shipped was 378,191 tons, compared with 280,294 tons last year, an increase of 97,897 tons, or 34.9 per cent. The increase is principally due to the large quantity of motor spirit now being handled in bulk. There are now three separate companies which handle light oils in bulk.

There was a substantial increase in the total quantity of wool and skins shipped, the figures being 205,139 bales, as against 179,343 bales for the previous year, an increase of 25,796 bales, or 14.4 per cent. Of the total wool shipped 148,088 bales were received from shore and rail and 57,051 bales were received by sea.

## The Dock and Harbour Authority.

Hemp and tow shipments show a marked decrease, there having been 48,916 bales, as against 65,020 bales, or 16,104 bales less than for 1927. Of the total, 34,894 bales were received from shore and rail and 14,022 bales were received ex vessels. It is unlikely that there will be any great improvement in hemp shipments until prices recover.

Butter, cheese and frozen meat outwards, including transshipments, amounted to 94,307 tons, or 322 tons more than for last year. Butter increased by 3,058 tons or 22.4 per cent. and cheese decreased by 2,351 tons or 5.5 per cent., while frozen meat decreased from 37,689 tons to 37,304 tons.

The value of all goods exported overseas from the Port of Wellington for the year ended 30th September, 1928, was £15,345,019, as against £11,683,223, an increase of no less than £3,661,796. There was an increase in the quantities of wool, butter, and fruit exported, but the increase in value is mostly due to the higher prices ruling last year.

The principal items exported were:—

	£
Wool	4,444,425
Cheese	3,068,679
Butter	2,168,143
Frozen Meat	2,109,995
Skins and Hides	1,017,973
Apples	380,420
Casings	290,472
Hemp and Tow	229,120
Tallow	206,421
Coal	74,257
Live Stock	61,163
Other commodities	1,293,951
	<b>£15,345,019</b>

The value of all goods imported was £14,957,048 as against £14,636,182, an increase of £320,866 over the previous year.

The imports were from the following countries:—

	£
United Kingdom	7,422,368
United States	3,447,540
Australia	1,350,136
Canada	843,329
Japan	357,130
Dutch East Indies	289,419
France	195,430
Germany	179,366
Belgium	126,183
Ceylon	117,393
British India	102,047
Sweden	71,147
Switzerland	65,569
Netherlands	59,566
South Africa	59,539
Italy	53,487
Other British Possessions	59,182
Other Foreign Countries	158,217
	<b>£14,957,048</b>

It will be seen that about two-thirds of the imports are from within the Empire.

The value of the trade of Wellington overseas was last year nearly one-third of the total trade of the Dominion.

With regard to the value of imports received, trade with the United Kingdom increased by £201,945; from Germany there was an increase of £59,396; from United States £40,062; from Canada £31,853; from Japan £31,086; and from France £29,904. Trade from Dutch East Indies decreased by £150,274 and imports from Australia show a decrease of £76,706.

It may be anticipated that with the prices now ruling for produce, there will be an increase in imports during the coming year.

#### FINANCIAL RESULTS.

The Income and Expenditure Account for the year ended 30th September, 1928, shows that the total income of the Board was £470,347 11s. 7d. and the total expenditure was £438,625 4s. 11d., the net surplus being £31,722 6s. 8d. as against £23,842 10s. 6d. for the previous year. Income increased by £14,290 19s. 3d., while expenditure increased by £6,411 3s. 1d. Considering the period the Dominion has passed through the results obtained are quite satisfactory.

Expenditure this year included a provision of £3,000 for depreciation in securities in connection with the Special Reserve Fund.

Working expenditure shows an increase of £5,826 4s. 4d. Repairs and Maintenance have increased by £6,707 which was due to some extent to portion of the cost of the alterations to the King's Wharf having been charged to Maintenance.

Payments for interest and sinking funds amounted to £66,650 as against £66,105 7s. 11d.

There was an increase in the amount received for storage of all kinds of £679 19s. 5d. Reductions in charges, which were in operation for three months of the previous year, were in force for the whole of last year and would amount to approximately £9,000.

The total Assets of the Board are now £2,623,595 8s. 9d. and the Liabilities £1,279,327 5s. 5d., the balance of Assets over Liabilities being £1,344,268 3s. 4d., as compared with £1,254,449 12s. 11d., an increase of £89,827 10s. 5d., made up principally of increment of Sinking Funds £29,103 2s. 7d., increase in the value of Special Funds £28,908 16s. 2d. and the balance of £31,722 6s. 8d. The public debt remains at the same amount as last year, viz., £1,250,000 against which the accrued sinking funds are £443,369 7s. 10d.

LIABILITIES ON ACCOUNT OF WORKS AUTHORIZED AND IN HAND.

The approximate estimated Liability of the Board on 30th September, 1928, for works authorized and in hand is as follows:—

	£
Thorndon Reclamation ... ..	40,000
Thorndon Breastwork, Section No. 2 ... ..	35,000
Alterations and Blocking between rails at Glasgow Wharf	10,000
Glasgow Wharf Cranes ... ..	14,000
New Plant and Machinery ... ..	5,000
	£104,000

The funds available are deposits amounting to £130,000 and the amount written off for depreciation which this year is £41,859 7s. 3d.

DOCK.

The Dock and Special Equipment Reserve Fund, which is being built up with the object of providing a large portion of the cost of a Floating Dock, now stands at £84,286 9s. 8d. To this will be added the sum of approximately £15,000 which is half the surplus for the year, so that the fund at the end of next year, with interest accretions, should amount to approximately £110,000.

Messrs. Clark and Standfield, Consulting Engineers, have advised that the middle of July is the most favourable time of the year for the dock to leave England. It will take three months to prepare plans and specifications, receive tenders and consider them, the time for construction of the dock, which includes allowance for delays and trials, is twelve months. It appears, therefore, that instructions to the Consulting Engineers to start should be given at the end of March in the previous year to which the dock is required to arrive at Wellington, so that, if the order is finally placed in March, 1930, the dock should be delivered in December, 1931. Plans are being prepared of a reinforced concrete wharf at which the dock will lie. The work should be put in hand a little before the dock is ordered and the dredging required for the dock berth should be completed at the same time.

TRAFFIC MANAGER'S STAFF.

There are at present 55 employees in Grade A, or three less than last year; in Grades B1, B2 and B3 there are 55, being a decrease of four; in Grade C the number of permanent hands has been increased from 61 to 62. There should be no occasion to materially increase the number of the permanent hands in the department at present.

Several old employees died during the year and have not been replaced. Two old employees retired, one was transferred to another department, and two resigned.

During the year twelve changes of grade involving promotions were made.

The maximum pay for Grade A is now 22/2 per day.

The maximum pay for Grade B is now 17/10 per day.

The maximum pay for Grade C is now 16/8 per day.

The gross cost of labour, both permanent and casual, employed on handling cargo and the tonnage handled was as follows:—

	£	Tons handled.
1920-21 ... ..	174,394	767,807
1921-22 ... ..	129,468	624,635
1922-23 ... ..	123,422	753,907
1923-24 ... ..	131,713	905,922
1924-25 ... ..	141,263	921,163
1925-26 ... ..	153,423	994,810
1926-27 ... ..	135,686	935,482
1927-28 ... ..	139,024	950,127

The actual cost of labour handling English and Foreign cargo, including receiving, stacking and delivering, decreased from 26.89d. per ton on 320,317 tons to 25.39d. on a tonnage of 340,497 tons.

The actual labour cost of handling Australian and Coastal cargo for this year was 26.33d. per ton on a tonnage of 367,105 tons as compared with 27.63d. per ton on 365,169 tons last year. The decreases are due to the better use of appliances, and to the improved working of the Board's staff.

FLOATING PLANT.

The self-propelled Floating Crane "Hikitia" has been in service throughout the year and has been used for heavy lifts from and to ships and also for the Board's own work when required.

The Tug "Toia" and the launches "Uta" and "Arahina" have been maintained in good order.

The pile driving punt and the concreting barge, which received a good deal of damage against the wharf in an easterly gale, and which sank at their moorings, were lifted by the floating crane. They have been repaired and are again being used on wharf construction.

BURNHAM WHARF.

This wharf, which is of reinforced concrete, is 841-ft. 6-in. long. Reinforced sheet piling is driven at the back of the wharf to support the filling. The wharf is anchored back to concrete anchors or is supported by brace piles. A reclamation of 1ac. 3r. 22.2p. from the wharf to the Halswell Point Road has been made for erection of buildings and for the receipt of certain classes of cargo. A substantial fence between the Point, Halswell road and the Board's property has been built, and suitable lavatory accommodation for the use of the men employed at the wharf has been provided. Lines of oil pipes to the Shell Company's tanks at Miramar and to the Vacuum Oil Company's tanks near the wharf have been laid by the respective Companies. A boiler house to provide steam to the tankers pumping oil ashore has been built by the Shell Company. A lease of the wharf to the Shell Company for seven years, under conditions approved by the Board, has been granted. During last year 20 vessels discharging bulk motor spirit and fuel oil berthed at this wharf and pumped 107,328 tons ashore.

THORNDON RECLAMATION.

Last year 1,162,150 tons of dredgings were pumped into the Thorndon Reclamation. Some 21,200 cubic yards of material from shore were also deposited on the area. A new dredge berth was built beyond the angle of the wall, to enable material to be deposited at the northern end of the reclamation. The progress of the work has been delayed since the latter part of July owing to delay in the construction of the necessary storm water culverts from Thorndon Quay and the Hutt Road to the Sea Wall. Contracts for these works were let by the Railway Department early in the year but progress has so far been slow. A number of tracks and sidings in connection with the new Goods Station have been laid by the Railway Department, which has also completed its arrangements for the erection of a large and complete Goods Shed.

OIL BERTH AT THORNDON.

The construction of a reinforced concrete breastwork at the southern end of Aotea Quay is well advanced towards completion. It is 867-ft. long and 700-ft. have been completed. To enable the Atlantic Union Oil Company, which has erected storage tanks at Kaiwarra, to pump motor spirit from the wharf to their tanks, an agreement was entered into whereby the Company was permitted to lay down an 8-inch oil pipe from the wharf and behind the sea wall. The right is during the pleasure of the Board, and should circumstances arise which would necessitate the removal of the pipe from its present position, it will be removed by the Oil Company at its own expense. Two bulk cargoes of oil were pumped ashore at this berth last year.

THORNDON BREASTWORK.

The Board authorized an extension of the quay, which forms the Oil Berth, by 885-ft., and this work is now in hand. 120 piles have been cast and pile driving is going on. Owing to an occasional easterly swell it has been decided to drive spring piling on this quay, which will, to a considerable extent, protect vessels that may lie there. This berthage, which is contiguous to the new Railway Goods Yard, will, as the trade of the Port develops, be of great service for berthing large ocean-going vessels. It is being dredged to 36-ft. O.L.W.S., which depth can be increased, if ever required, to 40-ft. O.L.W.S. Sufficient land is available between a proposed road and the quay for the erection of large cargo sheds.

KING'S WHARF.

The eastern side of the King's Wharf, which was blocked between the rails so as to give a flush surface for trucking on, was used last season largely for receiving heavy Liverpool cargoes, and proved to be very convenient. The western side of the wharf is being similarly flushed; the work is now well advanced, the cranes having been altered, the decking and beams renewed where it was necessary, guard rails laid alongside the rails, and new points put in.

GLASGOW WHARF.

Portion of the superstructure of the Glasgow Wharf under the railway tracks requires extensive overhaul and renewal. It is proposed to put this work in hand at the end of the present

export season. The hydraulic cranes on this wharf are now too low and have not sufficient rake to enable the larger cargo ships to be conveniently worked and the Board has authorised the purchase of larger and more suitable cranes for this wharf. The present cranes will be used on other wharves which are short of crane equipment. Owing to the necessity of keeping the export railway wharves in use in the busy season, the work will be somewhat drawn out.

#### DREDGING.

The Board's Dredge "Whakarire" has been continuously employed during the year dredging off the Thorndon Reclamation Wall for the purpose of obtaining material which was pumped into the reclamation. The Wanganui Harbour Board's Dredge "Kaione," which was chartered until the first week in August, was engaged lifting mud and silt off the Petone shore and pumping it ashore principally at the northern end of the reclamation.

The "Whakarire," working two shifts, dug and pumped ashore 443,200 tons of material, which was principally clay and heavy shingle. Due to the locality and the nature of the ground where the Dredge worked, the wear and tear on the dredge buckets and pumps was high, but inasmuch as a lot of steaming was saved by working at Thorndon, the amount dredged and pumped ashore was larger than for the previous year. It will be necessary to obtain a new pump for this Dredge next year. The average rate of dredging was 288 tons per hour and of pumping 400 tons per hour. 30.80 per cent. of the total time worked was occupied in dredging; 12.12 per cent. in mooring, unmooring and steaming to and from the dredging site; 22.15 per cent. in pumping; .98 per cent. in delays due to weather; 20.72 per cent. on overhaul and repairs; and the remainder in shifting moorings, holidays and sundry causes. The slipping of the "Whakarire" for annual survey took place in April, when she was inspected by the Government Inspector of Machinery and by Lloyds Inspector. Repairs were executed where required and the hull was thoroughly cleaned and painted with anti-corrosive and anti-fouling paints.

After writing off  $7\frac{1}{2}$  per cent. of the value at the end of the year, the value of the Dredge in the Board's books was £6,548 16s. 5d.

The insurance fund, which has been in operation since 1904, now amounts to £48,114 10s. 3d. Interest additions for the year was £2,775 14s. 10d.

The suction dredger "Kaione" was worked two shifts the whole time she was on charter. Altogether she pumped ashore 1,530,110 tons of dredgings, of which about 50 per cent. were solid. The average rate of dredging during the year was 863 tons per hour and pumping ashore 1,941 tons per hour. Of the time paid for, 20.25 per cent. was occupied in dredging; 34.74 per cent. in mooring, unmooring and steaming; 9 per cent. in pumping ashore; 6.55 per cent. in delays due to weather; 9.61 per cent. in overhaul and repairs; and 19.85 per cent. in holidays and other causes. The dredge was placed on the slip at the termination of her charter for inspection and painting. During the time the "Kaione" was in Wellington, the Dock site, with the exception of a small corner, was dredged to 46-ft. below O.L.W.S.

The Priestman dredge has been employed keeping various berths clean. During the year 10,000 cubic yards of material were lifted and deposited near Kaiwarra. The dredge machinery received its customary annual overhaul and heavy repairs were executed on one of the punts.

#### LAUNCH "UTA."

The launch "Uta," which was overhauled at the end of last year, has been equipped with a 110 h.p. Thornycroft Engine and is much improved both in speed and sea going qualities. She is now a much more useful vessel for the Harbour Master's Department, and has a speed of  $9\frac{1}{2}$  knots as against  $6\frac{1}{2}$  knots previously.

#### CRANES FOR SHEDS 24, 31, AND 33.

Ten two-ton electric overhead travelling cranes, which were ordered from Messrs. S. H. Heywood and Co., Ltd., of Reddish, have all been delivered and erected in the King's and Taranaki Street Wharf Sheds, and are now in use. The cranes are similar to those supplied by Messrs. Royce and Co., Ltd., of Trafford Park, and have proved to be useful and economical for stacking inward cargo and loading lorries. The labour cost of handling cargo on the King's Wharf has been decreased by nearly 3d. per ton since they were installed.

#### KING'S WHARF OFFICES.

This building has now been completed and is occupied by the Wharfinger's Staff, and portion of it as a store by the Shaw Savill and Albion Co. Offices for shipping companies are available on the second floor. Provision for housing the Board's ambulance was made but, as this has now been transferred to the Free Ambulance, the room is being temporarily used to house a fire engine.

#### SUPPLIES STORES.

The book value of the stock in hand on 30th September, 1927, was £27,285 14s. 2d; Purchases and Transfers amounted to £74,423 12s. 1d.; Working expenses were £2,305 0s. 10d. a total of £104,014 7s. 1d.; Issues, sales and minor adjustments during the year were £68,215 6s. 6d.; leaving the book value of the stock in hand on 30th September, 1928, at £35,799 0s. 7d.

The working expenses, which are charged as a percentage on the value of goods issued, worked out at  $3\frac{1}{2}$  per cent. on the issues.

#### TRACTORS.

During the year 220,215 tons of cargo were handled by the Board's tractors and trailers, compared with 193,059 tons for the previous year. The average cost per ton of cargo handled, which includes labour cost of driving, loading and unloading, the cost of repairs and maintenance, together with interest and depreciation on the plant, amounted to 14.02 pence as compared with 14.63 pence and 13.12 pence for the previous two years. The average number of tons of cargo handled per tractor hour was 19.22 and the cost per tractor hour, which includes labour and all other charges, was 22.46 shillings. The plant available comprises six electric tractors, nine mules, six Fordson tractors and 217 trailers.

#### COOL STORE.

Some 13,110 tons of cheese and 300,976 cases of apples passed through the Cool Store during the year, as compared with 17,073 tons of cheese and 169,003 cases of apples during the previous season. Cheese is not now allowed to remain for any length of time in the store as the cost of labour, receiving, stacking and delivering and the expense of cooling is not sufficient to reimburse the Board for the service rendered. Practically no cheese for the store is now delivered ex rail, nearly the whole of it being ex vessel, the charge for which on graded cheese is 4s. 6d. per ton, including receiving, delivering and cooling. It was recommended that the charges be reviewed and fixed at such a rate as would pay for the service, and in this connection it was proposed that the rate should cover a month's storage and that the fortnightly term be deleted. Full use was made of the apple chambers by the Fruit Control Board and the required temperatures were satisfactorily maintained. In view of possible expansion of this business and the increase in rail-borne fruit shipped at Wellington, the Board authorized the conversion of one of the large Cheese Store floors into apple chambers. This work is well advanced and the chambers will be available for next season.

#### MAINTENANCE OF PLANT AND MACHINERY.

The whole of the Board's cranes have been overhauled and repaired where required. They have been inspected by the Government Inspectors of Machinery who issue the certificates authorizing their use. Thirty-three crane chains of various kinds were taken off and annealed and seven were condemned and replaced with other chains. Fourteen lifting wires were renewed on the Railway, Glasgow and King's Wharves. All stationary boilers were opened up, examined and repaired where found necessary. Extensive repairs were made on the pile driver boiler and also to the pile driver engines and winches. The Tug "Toia" was slipped for annual survey and overhaul, when boilers were opened up and examined and all defects made good, and the main and auxiliary engines were overhauled and adjusted. The hull was scraped and painted with two coats of anti-corrosive paint and two coats of anti-fouling paint.

The floating crane "Hikitia" was slipped for painting and overhaul. The hull was scraped and painted where necessary with zinc and gold size and afterwards received two coats of anti-corrosive and two coats of anti-fouling paint. The boiler was opened up and cleaned, main engine, crane engines and auxiliaries were examined and adjusted where necessary.

The launches "Arabina," "Huia" and "Uta" were lifted out of the water, hulls and machinery inspected, overhauled and made good.

#### TIMBER STRUCTURES MAINTENANCE.

During the year heavy repairs were made to the west side of King's Wharf. A number of walings and braces on Jervois Quay breastwork were renewed. Glasgow Wharf now requires a good deal of work to put it in good condition. This will be started at the end of the present export season. A number of sheds were painted during the year. The iron on the roofs of some of the sheds is going and will shortly require renewal. Some of the decking on the outer tee of the Queen's Wharf will have to be renewed next year. The suburban wharves received repairs from time to time as required and to make good damage that had occurred. The cold air battery in A Building of the Cheese Store was dismantled and the timber work renewed.

## REPAIRS AND MAINTENANCE.

The cost of repairs and maintenance of the Board's buildings, wharves, quays, plant and machinery for the year was £39,922 1s. 10d. as against £36,520 8s. 2d. for the corresponding period of the previous year.

## WORKS CARRIED OUT BY THE BOARD'S STAFF.

Apart from ordinary maintenance and repairs, the following works were carried out by the Board's staff during the year:—Alterations to Sheds 24, 31 and 33, together with the erection and installation of 10 overhead electric travelling cranes; completion of Burnham Wharf and reclamation, including fencing, lighting and water supply; construction of latrines at Burnham Wharf; fencing around Oil Berth at Thorndon; new Coal Hoppers; flushing rails and altering hydraulic cranes on western side of King's Wharf; new offices King's Wharf; installation of Wilton furnaces in Power House boilers; new engine launch "Uta"; No. 4 dredge berth with water and electric lighting; new Tolls Office Railway Wharf; Dredge delivery pipes.

## WORKS IN HAND.

The principal works in hand by the Board's staff are dredging and pumping ashore for the Thorndon Reclamation; completion of the Oil Berth at Thorndon and its extension on the Thorndon Sea Wall; alteration to dock of King's Wharf; new crane cabs Queen's Wharf; additions to apple chambers at Cheese Store with direct expansion piping for cooling; beacon for Point Jerningham Light.

## WHARF ACCOMMODATION.

The Burnham Wharf has been in use throughout most\* of the year for the handling of motor spirit, and the congestion previously existing at Miramar has been relieved. The construction of the Thorndon breastwork will, in the meantime, provide berthage for vessels discharging rough cargo.

Last year the tonnage of vessels arriving was greater than in any previous year, but no great difficulty was experienced in providing berths for them, although during the busy export period there was a demand for more railway berths than could be at all times given.

The practice of laying up vessels at wharves, if permitted to extend, means the provision of expensive berthage on which very little return can be obtained. The berthage rate for vessels laying up is only 1/4d. per ton per day, so that on a vessel of say, 4,000 tons register, occupying a berth 400-ft. long, a charge of a little over £2 per day is made for the use of a berth worth approximately £20,000, on which repairs and maintenance have to be made and interest charges met. It appears that a shipping company which, owing to trade conditions, wishes to lay up vessels for comparatively lengthy periods, should, if their vessels are not equipped with suitable ground tackle, provide efficient moorings to enable them to lie in the stream or, in the alternative, pay the ordinary berthage rate when a berth at a wharf is available.

Proposals for the erection of dolphins and an approach jetty near Point Howard, to permit oil tankers to berth there for the purpose of discharging bulk oil ashore, have been considered by the Board, but up to the present time nothing definite has been arranged. The possibility of constructing a wharf at this point for the discharge of coal and other rough cargoes has also been investigated, and should circumstances warrant it, the Board is prepared to erect a wharf if a suitable guarantee for the payment of the fixed charges is given by the interested parties.

## PATENT SLIP.

The total number of vessels taken up during the year was 85, of which 29 were taken up on the smaller slip. The cast iron rails and racks on the large slip are a good deal worn and a large amount of renewal work will soon be required to keep the slip in working order.

## LOW LEVEL LIGHT.

The Marine Department is considering the transfer of the Pencarrow lighthouse, which is a coastal light, to Baring Head. If this change is carried out it will necessitate the provision of a stronger light with a greater range than at present in place of the Board's low level light. It was considered it would be found advisable to substitute in place of the present Wigham Light an automatic complex flash light which would be lit and operated by compressed acetylene and which would require less attention. This will necessitate the erection of a high tower to give the light a range of not less than 12 miles.

## IMPROVEMENTS TO MERSEY PIER.

There are now strong hopes that the New Brighton promenade pier will be ready for opening at the end of July. The work of reconstruction has been held up in consequence of the strike of Australian dockers. The timber required for the Pier deck is what is known as jarrah, a specially hard wood from Western Australia, and this was actually lying on the quayside when the strike occurred. It is now on the way to the Mersey and will soon be available.

## Book Review.

**Lezioni Di Costruzioni Marettime** (Lessons in Marine Construction)—550 pp., 411 Illustrations. By Enrico Coen Cagli, Professor of Engineering, University of Padua, Codam Casa Editrice Dott. Antonio Milani, Gia Litotipo Padua, 1928, VI.

The author states in his forward that he is fulfilling a long promise in publishing his lectures on marine construction. His courses at the University of Padua have been justly popular. The courses given at Padua (1924-1926) form the basis of the book. These courses are the only chair for Port and Harbour Engineering in Italy. There are not many such chairs in the world. Not only his students, but his many colleagues throughout the world, have desired to possess these lectures at hand between courses.

Coen Cagli has achieved a great reputation in this difficult field of engineering because of his practical experience in his many completed port works. This experience, fortunately, finds expression through his prodigious ability. His circle of friends and admirers has been widened through his brilliant reports and discussions—in any language that was convenient at the moment—at the International Navigation Congresses and other technical conferences. He is the only foreigner who is an honorary member of the Society of Terminal Engineers.

A long list of ports have been partly or entirely designed by him: Civita Vecchia, Naples, Antivarium in Montenegro, Genoa, Leghorn, Catania, and his greatest triumph, the new commercial and industrial port of Venice-Marghera\* where he is now Chief Engineer and Director. He has drawn the plans for the construction or extension of more than twenty seaports and has seen the works carried out. Therefore, a book from a professor who has actually designed and constructed all, or part, of a score of ports must be valuable to port and terminal engineers. This great work should be translated and published in English.

The large work is divided into two parts:

Part I. General Considerations; The Sea and the Coast.

Chap. I. Aim of the Study. Present Developments in Maritime Construction in Italy. Par. 2. Old and New Port Policies, Italy. Par. 3. Theoretical and Practical Difficulties of Marine Construction. Par. 4. Importance of Marine Works to protect Land, for National Defence and for Commerce. Par. 5. Evolution and Development of Maritime Commerce and Naval Construction. Par. 6. Transformation and Development of Ports in Their Relation to the Development of Traffic and Navigation.

Chap. II. The Sea.

Par. 7. Marine Hydrography. Sea Levels. Configuration and Nature of Sea Bottom. Par. 8. Sea Water. Its Physical and Chemical Construction; Materials. Par. 9. Materials in Suspension. Marine Organisms. Par. 10. Movements of the Sea: Tides.

Chap. III. The Wind. Pars. 11, 12, 13, 14.

Chap. IV. The Movement of Waves. Par. 15. Undulatory Movements of Liquids. Par. 16. Laws of Horizontal and Vertical Proportion, Separately Determined. Waves of Oscillation and Translation. Par. 17. Trochoidal Theory. Par. 18. Deductions and Conclusions. Par. 19. Cornaglia Theory of Bottom Surges, etc. Par. 20. Conclusions from Both Theories.

Chap. V. Force and Movement of Waves. Pars. 21, 22, 23.

Chap. VI. Habits and Protection of Coasts. Pars. 24, 25.

Part II. Ports—Form, Disposition, Arrangement and Structures of Principal Works.

Chap. VII. Chief Port Forms and Arrangement of Outer Works. Pars. 26-29. Chap. VIII. Fundamental Designs of Typical Breakwaters. Chap. IX. Defensive Works of Different Vertical and Mixed Types. Pars. 32-36. Chap. X. Works Within the Port Arrangement and Development of the Banks. Chap. XI. Bulkhead Walls. Various types. Chap. XII. Arrangement of the Shore (Wharf Layouts).

Even these chapter headings with a few sub-heads given here and there are sufficient to indicate the comprehensive and scientific nature of this great book. There has been nothing to compare with it in the field of port and harbour engineering, except Brysson Cunningham's two big works, "Dock Engineering" and "Harbour Engineering," published several years ago. It is a strictly engineering treatise that fills a wide open gap in port literature. Casual observation might lead to a hasty conclusion that Coen Cagli has covered the same ground as my two books, "Port Development" and "Port and Terminal Facilities," in view of several similar illustrations. But this is not the case. Prof. Coen Cagli has concentrated entirely upon a profound engineering treatise, while my efforts touched upon only enough engineering to explain the tools that the port commission needed to estimate the port facilities necessary for the given economic function. Coen Cagli has made a genuine contribution to port and harbour engineering. I am studying it carefully with interest and much profit.

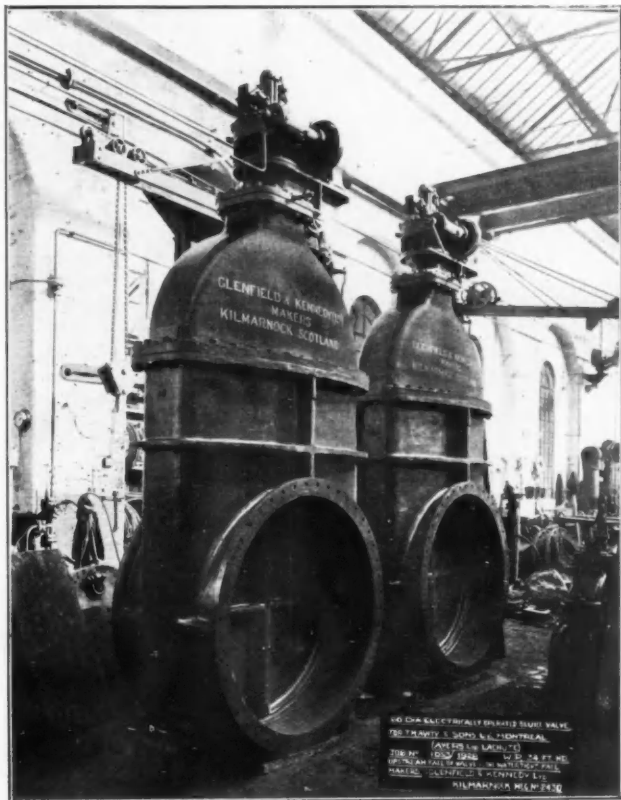
R. S. MACELWEE.

\* See "World Ports," October, 1928, and "Dock and Harbour Authority," February, 1929.

## Electrically-operated Sluice Valves.

### Two Interesting Units for Canada.

Distance electrically operated valves for water and steam continue to find more and more use and the tendency in modern waterworks practice, for example, is to control the main valves throughout the whole system from a central switchboard, so as to save time and labour in operation and prevent dangerous flooding and loss of water in the event of a burst pipe. The subject is, of course, directly interesting to dock and harbour work, and in this connection we are able to reproduce a photograph of two large diameter, self-contained, electrically operated, sluice valves, designed for remote control, recently supplied by Messrs. Glenfield and Kennedy, Ltd., of Kilmarnock, to the Ottawa Corporation, through Messrs. T. McAvity and Sons, Ltd., of Montreal.



Two 60-in. diameter Electrically-operated Sluice Valves.

These units are 60-in. in diameter and work under a head of 34-ft., the valve being operated by a small electric motor driving the screwed spindle through spur and worm reduction gears, all neatly mounted on a headstock, bolted to the valve cover. Current for this motor is controlled by a set of push-button controllers situated in the Engineer's office, the valve being automatically stopped at the extreme position of its travels by either one or other of the limit switches situated on the indicator hood and operated by the pointer. Also provision is made for hand operation in the event of failure of the electricity supply.

The methods of valve construction follow the firm's usual practice, the body being of the finest grey cast iron moulded in dry sand, which produces a very smooth finish. Heavy gunmetal faces are fitted to the valve body and door, being securely held in position by screwed brass pins, and hand scraped to form a perfectly watertight joint, while the operating screw is accurately machined from a forging of high tensile manganese bronze, working in a gunmetal nut secured to the valve door.

Great attention has been paid to lubrication, the worm reduction gear being housed in a totally enclosed cast iron casing which contains an oil bath, while lubricators are provided for all the headstock bearings and the ball thrust washers fitted to each end of the worm shaft are packed with grease. These features are the firm's standard practice for all worm gear operated valves resulting in a highly efficient drive which requires only a small amount of power for operation and a minimum of attention for long periods.

The valves are manufactured in all sizes up to 108-in. diameter, and for heads exceeding 800-ft., those for the higher pressures being constructed with cylindrical bodies, and as indicated, they are equally suitable for controlling water systems and exhaust, low, and high pressure steam.

Also one of the latest additions to the equipment is an electrical distant indicator, which shows on a dial situated in the

control house or engineer's office, the exact opening of the valve at any instant. The instrument consists of a transmitter operated by the valve gearing, and a receiver, and the installation of this device relieves the mind of the operator of all anxiety as to the working of the distant valve, since the motion of the valve door can be followed during the operation of opening and closing.

## Industrial Boiler Plant Efficiency.

### Some Further Interesting Examples of Coal Saving.

It is now well known that substantial savings are often awaiting to be made in the operation of steam boiler plant in most smaller boiler plants, such as used in docks, harbours and shipyards, and this is well illustrated by the Holden Wool Bleaching Co., Ltd., of Haslingden (Lancashire). This firm installed "Turbine" forced draught steam jet furnaces on their boilers in 1926, the general conditions being particularly difficult because of the violent fluctuations in the demand for steam. In a recent letter they state these furnaces have been very successful, enabling a cheaper grade of coal to be burnt with actually a less consumption weight for weight with therefore a substantial saving on the annual fuel bill. Also the total maintenance costs have so far been practically nil, about 15s., while the cleaning out is easier, this being due to the fact that the steam keeps the grates cool and prevents melting of the ash and clinker formation, the material being granular and therefore much easier to handle.

In another case, at Kircaldy, in Scotland, a boiler plant, which also happens to be in the difficult textile industries, was burning 17—18 tons per week of double washed nuts at 21s. per ton, which incidentally resulted in much smoke. After installing "Turbine" furnaces, the same steam is supplied by 15 tons of "Duff" small coal at 13s. per ton, cutting the fuel bill in half, a special trial undertaken showing that 60 tons of this "Duff" coal lasted practically five weeks, the previous consumption having been about 70—75 tons a month of the expensive coal.

Naturally the saving to be obtained on any given boiler plant varies according to the local conditions, especially as regards relative prices and quality of fuel available. The main point is, however, that furnaces of this character, hand-fired as usual, and with only one steam valve to control, enables any fuel, irrespective of the quality to be burnt at will by means of the forced draught blast, which results in adequate furnace temperature being obtained, with maximum emission of radiant heat. Also the consumption of steam at the nozzles does not exceed 2½—3 per cent. of the steam output of the boilers. This is practically no more than mechanical draught and without complications in the way of fans, engines, motors, trunking and dampers, while any boiler can be fitted merely by taking out the existing firebars. On these lines there can always be used fuels that represent the best value for money in actual heat units supplied, and the saving thereby as against ordinary methods of operation may be anything from 15—50 per cent. in normal practice. In this connection also a great advantage is to keep proper weekly records of the performance of the boiler plant, preferably with the aid of a water or steam meter, so that one quality of fuel can be tested against another on the actual large scale under normal running conditions.

## LARGE ST. LAWRENCE POWER DEVELOPMENT.

The "Financial Times" (Montreal) of April 19th states that the Beauharnois Light, Heat and Power Company, whose plans for the development of hydro-electric power on the St. Lawrence River were approved by the Dominion Government on March 8th, expects to be in a position to undertake preliminary construction work by July 1st next. Work on the main canal will be started early in 1930, though the construction of the main power house will not be completed until the summer of 1932. By November, 1932, the Company plans to have in operation four 50,000 h.p. units, and to be in a position to sell power under contract at a price of \$15 per h.p. a year.

The plans approved provide for navigation canal of the Welland Ship Canal standard, 600-ft. wide and 27-ft. deep at low water. The Company has been conceded the right to divert 40,000 cubic feet per second for use in the generation of electric power, and it is estimated that this will permit the production of 350,000 h.p. under 100 per cent. load factor. Of this total it is agreed that a substantial block shall be available to the Ontario Hydro-Electric Power Commission, with which body negotiations are now proceeding.

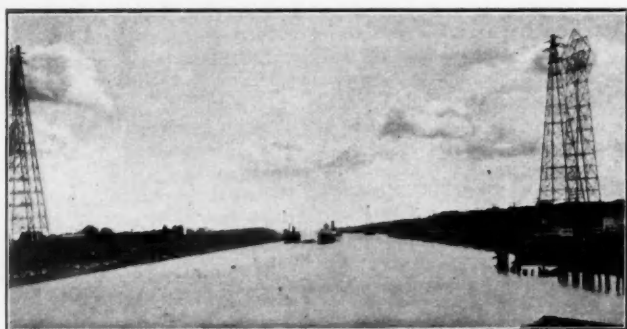
Should the Company at a later date obtain the right to store a certain amount of water in Lake St. Francis at "off-peak" periods, it is expected that an installation up to 500,000 h.p. on the basis of a 70 per cent. load factor could be put in. The total expenditure on the scheme as at present approved is stated to be estimated at \$65,000,000.

# The New Welland Ship Canal, Canada.

*A Strategic Link in the Greater St. Lawrence Waterways which will provide Ship Navigation between Lakes Erie and Ontario.*

ONE of the most important of the inland waterways in Canada is the Welland Canal. It is one of the principal links in the great St. Lawrence waterways connecting the Atlantic Ocean with the Great Lakes.

The Welland Canal connects Lake Erie with Lake Ontario, crossing the Niagara Peninsula about ten miles west of Niagara Falls. It overcomes a difference in level of 326½-ft. The original canal opened in 1829, extended from Port Dalhousie on Lake Ontario to the town of Port Robinson, where a connection was made with the Welland River. The course was down this river to its junction with the Niagara River and thence to Lake Erie. This was not found satisfactory, so between the years 1831 and 1833 the canal was extended along a route from Port Robinson to Port Colborne. The present canal—26½ miles in length—was completed in 1887.



View of Deep Cut Section No. 5 from Allanburg Bridge, looking South.

Several years ago it was found the canal was entirely inadequate for use by the modern steamships used on the Great Lakes. As is generally known, an important part of the business on the Great Lakes is that of grain carrying, and the constantly increasing output of the grain fields of Western Canada has resulted in the development of a particular type of "Upper Lake Vessel" built to carry immense cargoes of grain. These vessels of 600 odd feet in length, loading at the upper lake ports, while able easily to navigate Lakes Superior, Huron and Erie, are forced to discharge their cargoes at the foot of Lake Erie, either at Buffalo, N.Y., or Port Colborne, Ont., because of the restricted dimensions of the Welland Canal. The Canadian Government in 1908 provided a million bushel elevator at Port Colborne to facilitate the transshipment of grain from the upper lakes vessels to canal-sized vessels bound for Montreal, where it is shipped to Europe. This elevator accommodation was soon found insufficient, and twice since—in 1912-13 and again in 1923-24—additions were built, so that the Government has now a 3,000,000 bushel modern concrete elevator, the capacity of which is already taxed to the limit.

## WORLD'S LARGEST LOCK.

In order that there may be complete protection to the canal and vessels in it there is being built, in addition to the seven lift locks, a guard lock near the southern, or Lake Erie end, of the canal. This lock, known as No. 8, is 1,380-ft. in length between the inner gates. It is the longest lock in the world and is approached in size only by the two United States' locks at Sault Ste Marie, which are 1,350-ft. long.

A very important feature of modern canal construction is the manufacture and erection of the ponderous steel gates. In the case of the Welland Ship Canal, as may be imagined even by the layman, the supplying and erection of the gates is a matter of no small dimensions in itself. The approximate weight of metal in each lower gate is 454 tons, and the total estimated weight of metal in the lock gates, with their fixed parts and machinery, is 23,000 tons. In addition there is required no inconsiderable amount of machinery to operate the lock valves and valves in regulating weirs, the total estimated weight of metal in these items being 3,800 tons. The total estimated connected motor load for operating the canal and the Port Colborne elevator is 15,300 h.p.

With the very modern equipment being installed for operating the locks, including the working of the valves, opening and closing the gates, etc., great facility of movement of vessels is expected. The time required to fill one of these immense locks is only eight minutes, and the estimated time for a vessel to pass through the ship canal from end to end is eight hours.

## TO BE COMPLETED NEXT YEAR.

Concurrently with the increased grain production in Western Canada and the development of the large upper lakes vessels came the demand for a still larger Welland Canal. In 1912 Government surveys demonstrated that a shorter and better route could be had via Ten Mile Creek flowing into Lake Ontario. It was then decided that the time had come to begin the construction of an enlarged Welland Canal.

In 1913 the construction of the ship canal was commenced, and with little interruption has been proceeded with until the present time. It is expected the new canal will be completed some time next year. The total cost is estimated at about \$115,000,000. The ship canal is being built to modern standards under the most up-to-date methods and rigid supervision, and will, when finished, be a monument to Canadian engineering skill.

To overcome the 326½-ft. difference in level of Lake Erie and Ontario the new canal will have seven locks of uniform lift, each 46½-ft., whereas the present canal has 25 locks of varying lift. The difference between the old and the new becomes very apparent when this comparison is made, the other dimensions of the ship canal making the comparison of further interest. The useable length of the locks is 820-ft. as compared with 255-ft. in the present canal, the ship canal having locks of 80-ft. width, as compared with 45-ft. in the present canal. The width of the canal proper is to be 310-ft. at the water line and 200-ft. at the bottom. The immense locks are built to take 30-ft. of water on the sills, the canal reaches are to have 25-ft. depth, which may be increased to 30-ft. when the need arises.

## TERMINAL AT PRESCOTT, ONTARIO.

It is planned to erect 21 movable bridges of the most modern type across the canal, as in such a populous area there are many highways and a considerable number of railway lines. Each bridge is designed to carry the particular kind and volume of traffic offering at its particular location. In all cases the needs of navigation have been remembered, and the type of bridge and modern machinery provided for their operation have demonstrated in the cases of those bridges that are already in operation, that delays are reduced to a negligible quantity.

At both ends of the ship canal large harbour works are located. At Port Weller, the Lake Ontario entrance, a new and artificial harbour has been formed by the construction of two embankments extending into the lake for a distance of nearly one and a half miles. The entrance is 400-ft. wide, and widens out to a bottom width of 800-ft. in the harbour. The harbour is a little more than a mile long and covers an area of about 150 acres.

With the completion of the Welland Ship Canal the upper lakes freighters drawing up to 25-ft. will be enabled to proceed all the way down to the foot of Lake Ontario. This will mean that there will have to be established a terminal for these vessels for the purpose of trans-shipping grain cargo, the smaller vessels navigating the St. Lawrence canals. At the last session of the Canadian Federal Parliament the sum of \$1,500,000 was voted for the purpose of commencing the construction of the necessary terminals at Prescott on the St. Lawrence River, between Lake Ontario and Montreal. It is proposed to have these terminals ready, including dockage space and an adequate elevator, by the time the Welland Ship Canal is completed, probably in the spring of 1930.

## WESER HARBOURS' TRAFFIC DURING APRIL.

In April, vessels of 706,513 net register tons arrived in Bremen and the Weser harbours, i.e., 18,400 net register tons, or 2 per cent. less than in March and 62,100 net register tons or 10 per cent. more than in April, 1928.

In the first four months of this year shipping increased by 5 per cent. to 2,833,810 net register tons, against 2,702,194 in the same period in 1927.

The quantity of goods imported into the five most important Weser harbours was 368,200 tons, or 11,400 tons less than in March and 85,800 tons more than in April, 1928.

Exports were 205,400 tons or 29,800 tons less than in March, but 69,000 tons higher than in April, 1928.

For both directions together, there was a reduction of 41,200 tons or 7 per cent., or an increase of 154,800 or 37 per cent.

In comparison with March it must be considered that, in that month, as a result of ice conditions on the Rhine and at Antwerp, there was unusually heavy traffic in the Bremen harbours. Allowing for this, the figures for April are looked upon as satisfactory, especially as regards exports.

## The New Welland Ship Canal, Canada.



Port Colborne Harbour, looking South from opposite site of Bridge No. 22.



Port Colborne Harbour, looking North-East from top of Maple Leaf Milling Company's Elevator.

## The Port of New Orleans.

### NEW ORLEANS MARCH EXPORTS.

Exports of merchandise through the Port of New Orleans to foreign countries in March, 1929, reached a value of \$32,525,713, according to the report of the Customs section of the U.S. Department of Commerce. This figure is \$1,163,124 in excess of the total value of exports for the same month of 1928, representing the same steady increase of trade which the port has exhibited for the past two years.

Among the hundreds of commodities exported, the following are conspicuous examples: 7,044,215 pounds of pure lard, proportionate quantities of bacon, ham, eggs, preserved milks and other farm and dairy products, 208,582 pounds of canned shellfish, 13,373,164 pounds of rice, 117,071 barrels of wheat flour, 3,024,929 pounds of glucose, 7,275,246 pounds of leaf tobacco, 65,920 bales of cotton and 5,759 bales of cotton linters, 4,709,241 square yards of cotton piece goods, 1,195,380 pounds of jute, 93,594 railroad ties, 616,000-ft. of hardwood logs, 2,099,521 staves, 36,212,000-ft. of sawn lumber—pines, cypress, Douglas fir, redwood, ash, chestnut, cottonwood, gum, hickory, oak, poplar, walnut, and mahogany; 3,916,736 sq. ft. of wood veneers, and other large quantities of wood manufactures, 4,016,719 sq. ft. of pulp wall board, 107,660 barrels of crude oil, 1,487,264 barrels of gasoline and naphtha, 429,444 barrels of illuminating oil, 119,453 barrels of cylinder oil, 4,001,905 pounds of paraffin wax, 9,046 tons of asphalt, 1,673,333 pounds of salt, 6,115,207 pounds of carbon black, over a million dollars worth of cultivating and harvesting implements, and large quantities of iron and steel manufactures, such as 6,927,125 pounds of steel bars, and 4,589 metal beds.

### R. C. JORDAN BECOMES EXECUTIVE SUPERINTENDENT OF THE NEW ORLEANS PUBLIC ELEVATORS.

The Board of Commissioners of the Port of New Orleans announce the appointment of Mr. R. C. Jordan as Executive Superintendent of the grain elevator system operated by the Board. These consist of the New Orleans public grain elevator of 2,622,000 bushels storage capacity and the Stuyvesant elevators of the Central Elevator and Warehouse Company (Illinois Central Railroad) of 2,500,000 bushels storage capacity, the latter being under lease to the Board.

Mr. Jordan, who will have complete charge of the elevator system, under the general manager of the Board, is widely known among the grain trade of the United States. For over ten years he was superintendent of the Central Elevator and Warehouse Company at New Orleans, and for the past two years has been identified with the grain trade.

### NEW ORLEANS IMPORTS FOR FEBRUARY, 1929.

Merchandise imported through the Port of New Orleans in February, 1929, was valued at \$21,730,246, according to the U.S. Department of Commerce, an increase of \$1,153,987 over the imports of the same month in the previous year. Total foreign trade, exports and imports combined, for the month amounted to \$54,404,418, which is an increase of \$5,622,347 over the foreign trade of the port for February, 1928. The increase of import and export values for the first two months of the year, as compared with the first two of 1928, was \$12,369,333.

Some of the leading commodities imported through New Orleans in February were: 1,735,807 bunches of bananas, 35,963,074 pounds of coffee, 6,720,000 pounds of copra, 1,738,773 pounds of coconut oil, 4,651,914 pounds of sugar beet seed, 5,443 tons of sisal, 1,684 tons of unbleached sulphate, 2,058,596 pounds of newsprint paper, 916,635 barrels of crude petroleum, 312,055 barrels of gasoline, 25,422 tons of sodium nitrate, 1,525 tons of guano, 175,361,521 pounds of cane sugar, 1,630,000 gallons of molasses, 16,406,166 pounds of jute burlaps, 494,000 feet of mahogany logs, 12,518 cubic feet of block marble, 270,509 pounds of canned meats.

### INLAND WATERCRAFT ARRIVALS.

As compared with the same month of 1928, April arrivals of inland watercraft at New Orleans showed an increase of seven vessels and of 15,736 tons register, for vessels measuring above 25 tons. There were arrivals of 75 Mississippi-Warrior Service barges, of 49,461 tons; 24 Mississippi-Warrior power vessels of 21,459 tons; 82 other barges, of 29,333 tons; and 77 steamboats and miscellaneous power vessels, of 9,991 tons; total: 258 inland watercraft, of 110,244 tons measurement.

### INNER HARBOUR NAVIGATION CANAL.

The total movement of vessels north and south-bound on the New Orleans inner harbour navigation canal in April, 1929, was 837 vessels of 442,761 measurement tons, which is an increase of 31 vessels and of 80,016 tons as compared with April of 1928. The north-bound movement consisted of 76 Mississippi-Warrior vessels of 35,030 tons, 29 ocean steamships of 131,593 tons, and 302 miscellaneous craft of 62,665 tons. South-bound, it consisted of 68 Mississippi-Warrior vessels of 31,260 tons, 28 steamships of 118,769 tons, and 334 miscellaneous craft of 63,444 tons.

### APRIL SHIPPING AT THE PORT OF NEW ORLEANS.

In all respects the movement of shipping at New Orleans in April, 1929, displayed important increase over the movement for the same month of 1928, according to records of the Board of Commissioners of the Port of New Orleans. Increases were shown in the amount of ocean shipping, in river trade, and in the use of the inner harbour navigation canal.

There were 292 deep-sea vessels of 1,078,269 gross register tons entering the port in April, which is an increase of 40 vessels and of 191,215 tons, as compared with the same month of the previous year. There were 288 deep-sea departures, as compared with 272 in the previous April. Over 80 per cent. of this shipping used the public wharves, through which 435,438 tons of cargo passed during the month. This is in addition to merchandise handled at private wharves and industrial plants. Imports of bananas through the public conveyors amounted to 2,180,129 bunches.

The schedule of deep-sea arrivals at New Orleans in April, 1929, by nationalities and tonnage, is as follows:—

Flag.	No. of Vessels.	Gross Tonnage.
American	147	630,242
British	20	89,758
Brazilian	2	11,522
Belgian	1	6,110
Danish	8	23,473
Dutch	2	10,964
French	5	32,942
German	8	27,800
Honduran	40	89,231
Italian	7	42,033
Japanese	1	9,445
Norwegian	40	86,743
Nicaraguan	5	7,837
Panaman	2	1,336
Spanish	1	4,202
Swedish	3	4,631
Totals	292	1,078,269

## New Marconi Direction Finder for Naval Vessels.

A new wireless direction finder, Type D.F.M.4, has been developed by the Research Department of the Marconi Company for use primarily on all classes of naval ships as a navigational instrument.

Experience has shown that a wireless direction finder, to meet naval requirements, must be capable of taking accurate bearings from continuous wave, interrupted continuous wave, spark or telephone transmitters over a wide range of wave lengths.

The type D.F.M.4 equipment comprises three units: the frame aerial, the radio-goniometer, and the tuner and amplifier. The frame aerial, working on the well-known Marconi-Bellini-Tosi principle, consists of two fixed loops totally enclosed in strong metal tubes mounted on a pedestal. This is rigidly fixed to the deck and the leads to the receiver are well protected by being taken through the centre of the pedestal. In the receiver the tuner and amplifier are combined as one compact unit and cover a range of from 300 to 4,000 metres. To obtain this wave range three sets of coils are employed, and by means of a single switch mounted on the front of the receiver, any one set of these coils can be switched into circuit. An indicator shows which coils are in use and their wave range. Three Marconi shielded valves are used to provide high frequency amplification, and four tuning condensers which are calibrated in metres are used to tune the grid circuits of the high frequency and detector valves. Each of these condensers can be adjusted independently, but a common control enables them to be varied over a range of approximately 10 per cent. on either side of the wave length to which they are set.

For reception of continuous waves a separate heterodyne mounted in the amplifier is employed. In all seven valves are used, three high frequency amplifiers, one detector, one note magnifier, one local oscillator generator, which can be used as an additional note magnifier if required, and one coupling valve.

In order that the "sense" of bearings over the whole wave-band of the receiver can be obtained with the use of only a short vertical aerial, a stage of valve amplification using the coupling valve is employed for the vertical component.

The radio-goniometer is constructed as a separate unit which can be fixed in any convenient position. Two calibrated scales from which the bearings are read are mounted on the face of the unit. The inner scale is fixed and bearings taken from this scale are relative to the centre line of the ship. The outer scale can be rotated until the figure indicating the ship's true course is at the top of the dial opposite the zero mark of the inner scale, and then, if the ship is steady on her course the bearings read from the outer scale are true bearings.

## Belfast Developments.

The Belfast Harbour Commissioners believe in marching with the times and at a meeting on May 7th they decided to put in hand at once extensions and improvements which, when completed, will stabilise the position of the city as one of the front rank ports of Great Britain and Ireland. The main part of the scheme is the construction of a new dock on the Co. Antrim side of the river near to Workman, Clark and Co.'s shipyard. The dock, which will cost £302,000, will be one of the best equipped of the day and will be an enormous boon to shipping owners who use the port.

Close to the new dock there will be a new flour mill built by Messrs. Joseph Rank, Ltd., the notable English firm which proposes to develop its already big trade with Northern Ireland by producing flour on the spot. This will be the first time an English firm has come to Belfast for this purpose and it is expected that the traffic at the port will increase materially as a result of the new development. The scheme also includes a number of minor works which will go a long way to facilitate not only the shipowners, but the contractors who deal with the big volume of imports and exports at the port.

The following details of the new scheme were submitted by the Engineer, showing a turning basin and dock, giving the accommodation stated:—

(a) A quay 500-ft. in length on the west side of the proposed dock with a depth of 30-ft. at ordinary low water; (b) a quay 500-ft. in length on the east side of the proposed dock with a depth of 30-ft. at ordinary low water, together with a shed 600-ft. in length; (c) a quay 180-ft. in length on the south-west side of the proposed turning basin with a depth of at least 15-ft. at ordinary low water; (d) a quay 500-ft. in length on the west side of the proposed dock with a depth of 23-ft. at ordinary low water, suitable for timber discharge, etc., together with a shed 600-ft. in length; and (e) a quay 360-ft. in length on the east side of the proposed dock with a depth of 23-ft. at ordinary low water suitable for the discharge of material for shipbuilding, etc.

Details of the agreement between the Harbour Board and Messrs. Rank showed that the firm would take a site on the west side of the proposed dock for the erection of a mill. The Commission undertook to construct the following works.

A quay 410-ft. in length on the west side of the proposed dock of a character sufficient to enable the depth of 30-ft. at low water to be maintained alongside, and a quay 180-ft. in length on the south-west side of the turning basin of a character sufficient to enable a depth of not less than 15-ft. at low water to be maintained alongside, the harbour engineer to be authorised to carry out the remaining works, with the exception of a shed on the west side of the proposed turning basin, at a total estimated cost of £302,000.

Mr. R. E. Herdman (chairman) said the matter was the most important undertaking carried out for the last 25 years. It had been under consideration by the Board since 1918, but they could not see their way to face the large amount of outlay involved. The section which they had decided upon was part of a scheme of development on the Antrim side. The natural thing would be to have an approach direct from the sea to these docks, but at present that was quite impossible.

The question of finance had to be determined, and in this connection Mr. Pollock (Minister of Finance in the Ulster Government) considered how Government help might be given to the scheme. He was supported by the Prime Minister, who had also taken the greatest interest in the question, and had discussed many years ago the possibility of this dock being undertaken. After consultation between the Prime Minister and various other Ministers, including Mr. Andrews (the Minister of Labour), the Government had made an offer which was so generous that the Commissioners felt it would be impossible for them to decline it.

Some of the members of the Board were a little nervous about the outlay which they were undertaking, but when the Government finally decided what they were prepared to do these members had withdrawn their opposition, and so the Commissioners had now unanimously decided upon their course.

The importance of the work he could not accentuate. If everything went right the scheme would give employment for at least over 400 men and for a period of two years, if not three. It would enable them to give accommodation to Messrs. Rank, who were anxious to come to Belfast, and who would bring what possibly might be described as a new industry, and what was to the benefit of the harbour was to the benefit of their Province. He would like to emphasise that the Prime Minister, the Minister of Finance, and the Minister of Labour had throughout taken the greatest interest in the scheme with the object of securing relief for the unemployed, and they had generously done their part to make the scheme practicable so as to afford relief.

He thought the Board were adopting a very wise course, and were following in the steps of their predecessors and carrying on the policy of enterprise which was always the characteristic of their Board.

Mr. S. Berkeley said under the scheme increased facilities would be afforded for foreign tonnage, both as regards wharf-

age and shed accommodation, and the scheme lent itself to future extensions. Further, as Messrs. Rank were bearing the cost of the quay walls and erection of the mill it could not be contended that the Board was unreasonably lending themselves to facilitating newcomers against existing millers. It must be admitted that foreign tonnage just at present did not justify expenditure on harbour extensions.

Mr. Berkeley went on to say that they must have some faith in the future, not only as regard trade generally, but particularly as affecting their province, and bearing that in mind he felt that as a Board they could not reject the generous offer made by the Government. The scheme when completed would also have the advantage of rendering possible a re-organisation of berthing calculated to relieve the congestion which still existed in the cross-Channel services on Donegal Quay. The work if sanctioned that day could be commenced immediately, and the amount of relief to unemployment in their city to be thereby afforded was a factor that could not be overlooked by the Commissioners in reaching a decision.

The Board decided to proceed forthwith with the scheme.

## Ceylon and Indian Notes.

### COLOMBO PORT TRUST QUESTION.

Mr. T. H. Elderton, the deputy chairman of the Board of Commissioners for the Port of Calcutta, has just forwarded his report on the question of the formation of a Port Trust for the Port of Colombo. Mr. S. P. Hayley, chairman of the Ceylon Chamber of Commerce, interviewed on the subject, said that he had not yet studied the report and he was unable to divulge its contents until the Chamber of Commerce had had an opportunity of considering it. Asked whether the Chamber intended to recommend the formation of a Port Trust in Colombo, Mr. Hayley said that that would depend on what the Chamber thought of Mr. Elderton's report.

Mr. Elderton, it will be remembered, came out to Colombo in February this year to assist as adviser to a sub-committee of the Chamber of Commerce which had been appointed to go into the whole question of the advisability or otherwise of the formation of a Port Trust in Colombo. The appointment of this sub-committee was the outcome of an interview with a deputation consisting of the Chamber of Commerce Shipping, the Ceylon Association in London, and the Ceylon Chamber of Commerce recently had with Mr. Amery, the Secretary of State for the Colonies.

### GALLE HARBOUR.

According to statistics just prepared, regarding the activities of the Galle Harbour during the past year, there was a reduction in the number of vessels calling at the port. The drop totalled 39 as compared with the figures of 1927. This reduction was due solely to the discontinuance of the island steamer service of the Ceylon Steamship Company. The total number of ships which called at this port was 91 as against 130 in the previous year. The average tonnage of the ships that called was 4,843 per ship. Thus, it will be seen that vessels of only light draught still put into this harbour owing to its rocky nature. There were a few experiments carried out during the year under review with satisfactory results. The introduction of permanent anchors and buoys was in the right direction. The uniform system of buoyage was another introduction. The doing away of night signalling has not resulted in any inconvenience being caused to shipping. On the other hand, there has been a saving as a result of the reduction of the signalling staff. The position of the "Capera" buoy was changed, allowing vessels to be berthed at a greater and safer distance from the other berths.

### REDUCED PORT CHARGES.

With a view to attracting shipping, a new and reduced scale of charges for stern moorings was introduced at the Galle Harbour during the course of the year, a concession to be appreciated by shipping agents. Messrs. Walkers and Clark Spence reopened the coaling sheds, and coal is now always available at this port. The same firm has erected a water tank, and the supply of water to shipping, which was a difficult problem for many years owing to the scarcity of water, is successfully tackled. No accidents of any serious nature took place during the year, but the port had to be closed to shipping on two occasions owing to strong seas and gales. The long-desired survey of the harbour is to be undertaken this year, and the port is also to be supplied with a steam launch for the use of the pilot, thus doing away with the kataram which has been the pilot boat for years. The question of providing a jetty solely for the use of the harbour labour staff will doubtless be considered shortly.

### MADRAS HARBOUR CONGESTION.

Public attention has been called of late to the growing congestion in the Madras Harbour owing to the inability of the Port Trust authorities to provide adequate warehousing accommodation for shippers in the space at their disposal. Correspondence has already passed between the South Indian Chamber of Commerce and the Government of India on the subject. The subject had also been under correspondence between the Madras Port Trust authorities and the Government since October, 1920, but nothing has yet been done to permit the expansion of the

port; hence this move in the matter by the Chamber of Commerce.

The Chamber of Commerce authorities, after quoting statistics to show the rapid growth of the trade of Madras, in their correspondence with the Government points out that the trade might have improved more rapidly had it not been for the lack of facilities of accommodation in the port. The mercantile community, both importers and exporters, has been in consequence experiencing a great deal of hardship during recent years. The exporters' goods have been kept out of the port till after the arrival of the steamer, when the weighing or measurement, marking, Customs inspection and loading have to be hurried through and done imperfectly. On many an occasion steamers are missed in this manner, causing great loss, inconvenience and violation of terms of contract. In some of the busiest months heaps of goods are stacked in the open, exposed to sun and rain, and it is not seldom that grains and oil-seeds are very heavily damaged in this way. The Port Trust authorities have in the result been hard put to it to reduce the inconvenience and loss to the merchants, and they have been compelled to take such questionable steps as reducing the "free" days, refusing leases of warehouses, stacking in the open, and so on.

#### ADMINISTRATIVE DIFFICULTIES.

Several administrative difficulties are also met with by the Madras Port Trust authorities owing to the restricted space for railway yards and officers' quarters and offices. In the result a stage has been reached in which any expansion in the trade of the port is a physical impossibility until the Government are pleased to permit the use of the adjoining open space by the Port Trust authorities. The objection to the scheme for the extension of the port has emanated from the military authorities owing to the fear that the defence of Fort St. George would be affected by the diminution in the open space around the fort. On the other hand, if about 50 acres required immediately by the Port Trust were handed to them, there would still be left as much open space on that side of the fort as on the other side. Moreover, the actual use to which the premises of the Port Trust are put do not in any way support the apprehensions of the military authorities. The Chamber are strongly of opinion that the Government of India should urge the military authorities to give possession of the land to the Port Trust and leave the trade of the port to grow unhampered by the restriction of available space.

#### ADDITIONAL TRAVELLING CRANE FOR COLOMBO.

At a recent meeting of the Colombo Port Commission, held under the chairmanship of Mr. B. G. de Glanville, principal collector of Customs, a letter was considered from the Admiralty agreeing to contribute half the cost of the proposed additional travelling crane for the Colombo Graving Dock, subject to the following conditions, together with a memorandum on the subject: (1) The design of the crane and crane road to be subject to Admiralty concurrence before a contract for same is arranged. (2) That a substantial portion of the contribution from Naval Votes is to be payable only upon the satisfactory completion of the work and the availability of the apparatus for naval purposes. (3) That the priority in the use of the dock which the Admiralty have will also be extended to the crane.

It was decided: (1) To recommend to Government that the offer made by the Admiralty should be accepted, provided that the following conditions are also agreed to: (a) That the crane shall be the property of the Ceylon Government. (b) That the Ceylon Government shall keep it in proper and reasonable repair ready for use. (c) That the Admiralty shall pay actual cost for the use of the crane as in the case of the dock. (2) That the application should be made to Government for the necessary provision of half the cost of the crane, Rs.80,000, in the current financial year.

#### HARBOUR POLICE.

With the opening of the new Colombo Customs building and Passenger Jetty, the fate of the Police Hulk, which thus far housed the Colombo Harbour Police, has been definitely settled. The hulkmen have shifted into their new and spacious quarters, and the hulk has been abandoned for good. Many stories are connected with the fate of the vessel. It was stated some time ago that she was to have been towed out to sea, where she would be broken up and sunk. There was yet another rumour about its being sold as firewood, but it is now known that she is to be definitely sunk, but will serve a useful purpose even in her final stages. She will be towed alongside the south-west breakwater, where she will be filled with sand, towed five miles out to sea, and used as a target for artillery practice before she is finally sunk.

#### INDIAN SEAMEN IN THE UNITED KINGDOM.

The Government of India have had under consideration, in consultation with the High Commissioner for India, the question of facilities in the United Kingdom for the protection of the interests of Indian seamen who are charged with offences under the Merchant Act. The High Commissioner for India has been empowered to deal with questions which arise in Europe in connection with Indian seamen, and arrangements have been

made with His Majesty's Government by which the police are required to report to the High Commissioner all cases of the arrests of Indian seamen for offences that would render them liable, on conviction, to imprisonment, and prison governors have been instructed to report every case of admission of an Indian seaman to prison. In addition the attention of all clerks to Justices have been drawn to the channels through which efficient interpreters may be obtained. The High Commissioner, on receipt of these reports, will take such further action as may be found necessary or desirable in any particular case. For this purpose the Board of Trade have agreed that the Lascar Transfer Officers in the United Kingdom may be employed by the High Commissioner. Normally, these officers will act only under instructions from the High Commissioner, but they have also been authorised to act on their own initiative in cases of urgency.

#### BOMBAY PORT TRUST NEW MEMBERS.

The following have been appointed to serve as Trustees of the Port of Bombay for two years beginning from April 1st this year: Sir Ernest Jackson, Kt., C.I.E.; Mr. R. D. Bell, C.I.E., I.C.S.; Major-General G. A. Weir, C.B., C.M.G., D.S.O.; Mr. S. Burn, M.Inst.T.; Mr. T. A. Stewart, I.C.S.; Rear-Admiral H. T. Walwyn, C.B., D.S.O., R.N.; and Mr. Seyed Manawar.

Sir Purshottamdas Thakurdas has been re-elected unanimously as the representative of the Merchant's Chamber on the Bombay Port Trust as from April. He represents the Cotton Section of the Chamber.

#### CALCUTTA PORT COMMISSION.

Mr. C. de M. Kellock, of Messrs. Gillanders Arbuthnot and Co., and Mr. A. L. B. Tucker, of Messrs. Kilburn and Co., have been elected representatives of the Pungal Chamber of Commerce on the Calcutta Port Commission.

#### COLOMBO PORT COMMISSION.

Mr. O. L. Beresford-Hope has been appointed to be an unofficial member of the Colombo Port Commission to represent the oil bunkering interests during the absence of Mr. T. W. Hockly from the island.

#### RAILWAY OFFICE AT COLOMBO CUSTOMS.

A railway booking office for the purpose of supplying information to tourists has been opened at the new Colombo Customs House. Besides booking passengers and serving the purpose of an enquiry office, this new bureau will also be a means of advertising the railway among visitors to the island. Two officers have been appointed in charge.

#### FOREIGN TRADE OF KARACHI.

Statistics of the foreign trade of Karachi for March this year show that the total value of imports amounted to three crores and seven lakhs of rupees, an increase of Rs.76 lakhs, and that of exports to Rs.37,960,000, an increase of Rs.10,700,000 compared for the figures for the corresponding month last year. All the goods were imported through the Port of Karachi.

#### TRADING ON BOARD SHIPS.

The Homeward Shipping Conference has, it is stated, refused to grant permits on any condition to those desirous of trading on board ships in the Colombo Harbour. It will be remembered the Workers' Federation, through Mr. S. P. Hayley, chairman of the Ceylon Chamber of Commerce, made representations on the subject. The Conference could not consent to the proposal as they have definite instructions from the shipping companies concerned not to grant any permits. The consensus of opinion at the Conference was strongly against allowing any trading on board ships. The suggestion was made to the Conference that permits may be granted to bona-fide traders for whom the Workers' Federation would stand guarantee, but the Conference felt that it was wholly impossible to draw the line without creating dissatisfaction, as exceptions could not be justified. The Conference, however, has no objection to merchants trading from bum-boats.

#### COLOMBO HARBOUR MATTERS.

The Colombo Harbour Engineer reports that it will not be possible to erect during the current financial year the concrete dolphin at the Graving Dock entrance, as the dredger "Sir William Matthews," which, it was expected, would dredge the site, has been unavoidably held up for extensive repairs to her boilers, etc. He also does not wish to attempt to work in the south-west monsoon, and considers it would be better to defer it till the next north-east monsoon.

The enlargement of the Pettah Warehouse No. 2 has been completed, and handed over for use, but the painting and work in the yard outside the warehouse have yet to be completed.

With a view to preventing smuggling of dutiable and prohibited goods, frequent patrolling of the harbour and visits to ships by the Customs Preventive Staff have become necessary since the trading in the harbour under restriction was allowed. The construction of a sea-going launch for this purpose, and for the supervision and control of the bum-boats, has been completed by the Harbour Engineer's department.

## Hull and the Humber.

At the May meeting of the Hull Chamber of Commerce and Shipping it was resolved to make representations to the L. and N.E. Railway Company that some allocation should be made by the company from the Budget concessions of the Government for the improvement of the facilities of the Port of Hull. The suggestions placed before the Chamber were the provision of a new grain silo at the Alexandra Dock (additional to the one at the King George Dock); floating elevators and automatic weighers; coal hoists at the King George Dock; up-to-date cranes at the old docks, etc.

Mr. Minnitt Good, chairman of the Shipping Committee, said that they had been urging for a long time that the dock accommodation should be improved and extended, but had always been met with the retort that the company had no money to spare. Now, however, the railways were to have remitted the passenger duty conditional on their undertaking capital expenditure estimated in the region of two and a half million sterling. In these circumstances it was only right that Hull should put in its claim to have a share of the money spent on the dock estate.

Mr. E. P. Hutchinson seconded the resolution, and Mr. Field Till supported that the sympathy and support of the Hull Corporation should be enlisted. He had reason for believing that the Corporation were moving in one or two directions, and added that there was a better feeling between the London and North-Eastern and the civic authority and towards the city as a whole. Letters received from Sir Ralph Wedgewood with regard to extended hotel accommodation and developments generally were very reasonable and helpful. It was essential that they should work in complete harmony with the L. and N.E.R. The spirit was towards that end, and he hoped that nothing would be done to interfere with what the Lord Mayor had in view at the present time.

The resolution was passed, and a copy of it was ordered to be sent to the Lord Mayor for his information.

The successor of the late Mr. R. L. Fergusson as district goods manager at Hull is Mr. E. V. Taylor, who has been associated with the Hull docks for many years and is well and favourably known to a large number of people connected with the trade and shipping of the port. Mr. Alexander Wilson, who is retiring from the position of divisional general manager for the southern area of the L. and N.E.R. under the age limit at the end of June, had intimate associations with Hull during the construction of the King George Dock.

The Humber Conservancy Commissioners at their annual meeting at Hull decided to make a further reduction in shipping dues. From June 1st these dues will be 33.3 per cent. below the statutory maxima as against 30 per cent. minus previously ruling. The Finance Committee reported that the revenue account for the year 1928 showed a normal income over expenditure of £7,903, and the collector estimated that the surplus for the year ended December 31st next would be £5,614. The application of the United Kingdom Pilots' Association for an increase of 30 per cent. in the pilotage rates on the Humber was the subject of further reports, in which it was stated that the Board of Trade proposed to meet the pilots' request that the general question of the rules be considered at the same time as the ballast rate. The Chamber of Shipping, it was stated, had made representations to the Board of Trade showing that the remuneration of pilots was in excess of the earnings of the sea service. The Conservancy Board reiterated their opinion that there is no reasonable cause for the proposed increase, and intimated that they would resist the application.

Mr. J. H. Fisher, J.P., was unanimously re-elected chairman of the Board, and Mr. Tom Sutcliffe (Grimsby) deputy chairman.

The annual report of the Humber Conservancy Board makes reference to the Trent Falls Improvement Act, 1926, by which the Aire and Calder Navigation were authorised to construct training walls for the purpose of forming a tangential junction of the Rivers Ouse and Trent where they enter and form the Humber. The Aire and Calder Navigation are required to complete the whole of the work by July, 1934, and the Conservancy Board are to contribute a sum not exceeding £76,000 towards the cost of the part of the works which will be in the Humber and in the Trent and therefore under the jurisdiction of the Board. The actual work, the report added, was commenced on January 15th of the present year. The proposed seaplane mooring buoy supported by the Air Ministry was the subject of a special report by a sub-committee. It was recommended that as an experimental measure the Board agree to maintain such a buoy subject to their being under no liability for any damage that might be caused to or by the buoy. It was suggested that the Air Ministry should provide the buoy and its moorings, as they would be of a special type and that for the present no charge be made for the use of the buoy.

The question of improved facilities between Yorkshire and Lincolnshire via the River Humber in the vicinity of Hull is again to the front, the Hull City Council having at its May meeting unanimously passed a resolution to the effect that steps be taken to convene a conference of the various authorities

concerned on both sides of the river for the consideration of the practicability of a scheme being promoted for the bridging or tunnelling of the Humber. Various schemes of a tentative character have been put forward with the same object in view, but have not been advanced beyond the stage of friendly discussion and pious aspirations. At present the only direct means of communication is by steam ferry between Hull and New Holland, and this has long been considered inadequate in view of the importance of Hull as a seaport and the tremendous advance North Lincolnshire is making as an industrial centre, chiefly in iron and steel manufacture.

The visit to Hull of the High Commissioner for the Union of South Africa (the Hon. Eric H. Louw) was a notable success. After a tour of the docks the distinguished visitor was officially entertained at a banquet at the Guildhall attended by a numerous and influential company.

Responding to the toast of his health, Mr. Louw remarked that people were apt to consider the question of Empire trade without paying sufficient regard to the elementary economic principles which regulated the flow of trade between two countries within or without any international group. Sentiment, he said, was good, but it would never influence trade beyond a certain point. In the commodities in which Hull and South Africa were interested there was the basis for extensive trade and for the establishment of direct shipping facilities. He suggested that a fillip to this development would be given by a greater demand for South African produce in the hinterland of Hull and a reduction in rail charges on fruit, etc.

Colonel Sir Murrough John Wilson, K.B.E., M.P., a director of the L. and N.E.R., asserted, however, that the High Commissioner had put the cart before the horse. South Africa wanted to sell her fruit, and it was up to her to see that it was sold in this country rather than we should see that we bought it. It was for South Africa to advertise her products and to encourage trade to flow between South Africa and Hull.

Other recent visitors to Hull include Major C. L. Tilden, the president of the Board of State Harbour Commissioners of San Francisco, Mr. Gilman, representing the Governor of Ohio, Mr. James Pacey, representing Mr. J. Spencer Smith, president of the New Jersey State Board of Commerce and Navigation, and Mr. G. Loveday, travelling director of the Morris Services Incorporated of New York. These were conducted over the docks and greeted by the Lord Mayor.

At the quarterly meeting of the Bridlington (East Yorkshire) Piers and Harbour Commissioners, the Clerk (Mr. G. Hemkinson) reported that the tonnage tolls and dues for nine months ended March 31st amounted to £838, and that the balance in the treasurer's hands was £540. The receipts, however, do not include the annual payment in respect of the pier rate to be received through the Lords Feoffees of the ancient manor of Bridlington. It was stated that the cost of the Provisional Order reconstituting the Commissioners was £219.

A discussion was initiated by the chairman (Alderman W. Hakes, J.P.) as to the desirability of providing an official tidal gauge, and it was stated that the variation in the depth of the sandbank immediately outside the harbour constituted a difficulty. It was decided to defer further consideration of the matter until the visit of Admiral Douglas some time in May.

## LARGE NEW POWER DEVELOPMENT IN MANITOBA.

It is not generally known in Great Britain that the rivers débouching into Hudson Bay, although of comparatively small value for navigation, are likely to be immensely important in future years in connection with the development of hydro-electric energy.

The rivers in question are estimated to be capable of developing no less than 5,000,000 h.p. on the basis of a twelve-month flow, or as much as 9,000,000 h.p. on a basis of the ordinary minimum flow.

The Nelson River, in particular, is believed to contain water power sites at which more power can be developed than existing Treaty rights render possible at Niagara Falls.

In this connection, it is of interest to note that a Company known as the British Dominion Power Corporation, has just been formed in London and is securing from the Government of Manitoba the right to develop power at White Mud Falls on the Nelson River, where 300,000 h.p. will be generated for distribution to mining enterprises and to the Towns of The Pas and Cold Lake in Northern Manitoba. The new development is expected to involve a total outlay of about \$50,000,000. In the Manitoba Legislature it was explained that the Company expected to spend from \$50,000 to \$75,000 on a preliminary investigation of the Falls, and that the initial development when begun would be about 40,000 h.p.

The White Mud Falls are located almost directly north of Lake Winnipeg, and approximately 350 miles from the City of Winnipeg. The Falls are 170 miles east of the Flin Flon mine and a similar distance from The Pas, whereas the distance to the Hudson Bay Railway line is approximately 30 miles.

The Company named is stated to have been formed by Messrs. Close Bros., Ltd., the well-known London issuing house.

## Traffic and Developments at Italian Ports.

**A**T present it is only possible to consider the position of three Italian harbours during 1928, as the statistics concerning shipping during the past year for other ports have not yet come to hand. These three ports are Genoa, Venice, Trieste, etc.

At Genoa, according to the statistics from the Consorzio Autonomo del Porto di Genova, shipping during 1928 included the following figures:—

	1927.	1928.
Goods unloaded (tons) ...	6,760,040	7,018,077
Goods loaded (tons) ...	921,566	962,576
Total ...	7,681,606	7,980,653

In connection with this progress it ought to be taken into consideration that the Consorzio Autonomo del Porto di Genova has completed several works in order to ensure the smoothness of water in the inner harbour, while it has been decided to construct a new dock on the west side of the Bacino Vittorio Emanuele III. Now Genoa has a quayage of about 12,000 metres which will be increased to about 20,000 metres, thus augmenting the capacity of the port. However, Genoese shipping circles, which have seen during 1928 the inauguration of one of the most important works demanded for some years, and this is the new large dry dock of the Ente Bacini at Le Grazie. Previously the big liners were forced to dry-dock at La Spezia. The construction of a new direct railway line from Genoa to Milan is being urged, since the two which now exist can no longer handle the whole trade developing through this port in spite of the fact that they have been electrified. In the course of the past few months even the Genoa—Ovada—Alessandria railway has been electrified, but it ought to be remembered that the industrial requirements of Lombardia and Piemonte are increasing from day to day (the consumption of electricity has increased about 100 per cent. since 1913), and one would be inclined to believe that this has caused a decrease in the consumption of coal. The statistics which have just been published show, instead, the opposite: coal consumption has also increased, so that a further line is required.

On the other hand, there has been rather hard competition between Genoa and Venice in the cotton trade, particularly as far as American cotton is concerned. Venice inaugurated in October, 1927, two new warehouses to handle the cotton trade with large unloading and storage facilities. These warehouses, built in concrete, were built on State-owned territory, so that no rent had to be paid, while the new Genoese warehouses have been built on the territory owned by the Consorzio Autonomo del Porto, which rented the same to the Docks. Cotton against the payment of heavy charges, and with the understanding that within a certain number of years the warehouse should become the property of the Consorzio. Under these circumstances, while Venice had reduced charges to the minimum (as a matter of fact, the unloading and transhipment of a ton of cotton cost 11 lire, whereas at Genoa charges were much higher). On the other hand, other factors played an important part in this trade, and the fact that many cotton factories are situated in the direct Genoese hinterland, and also that some American insurance companies requested a larger premium on the bales directed to Venice than on those to Genoa, because of the better shipping connections between the Gulf Ports and Genoa than those between Venice and New Orleans.



Interior View of the New Warehouse No. 64 in the Port Duca d'Aosta, at Trieste.

In spite of all these difficulties Venice succeeded in securing a lot of business even from the Genoese hinterland, including Swiss imports, and some spinners would have been ready to develop such business should the Provveditorato del Porto have granted larger facilities, as it was rather difficult for one firm

to have shipments made both at Genoa and at Venice. They intended to concentrate the whole business in Venice. However, in the course of the last few months much of this business has turned into Genoa, and complaints are made against the fact that the steamers of the American export lines, and of the Dixie lines are first calling at Genoa, and then at Venice, so that there is a delay in the delivery at Venice in respect to Genoa, which has a certain importance in the choice of the port independently from the fact that certain lines like the Odero are granting heavy premiums to secure the shipments of cotton.



New Warehouse No. 2a in the Free Port Vittorio Emanuele III., at Trieste.

The progress in the Adriatic shipping has been noticed only in the course of the last two or three months of 1928. However, general statistics have shown an increase, as can be seen from the following figures:—

	1927.	1928.
Goods unloaded (tons) ...	1,656,935	1,900,125
Goods loaded (tons) ...	813,500	796,344
Total ...	2,470,435	2,696,469

The creation of the industrial zone in the port of Trieste can be considered as the most important event of 1928 from the shipping point of view. According to the decree creating this free zone all the new industries which will be erected within a certain territory in the harbour of Trieste, and which will be administered by a stock company controlled by Trieste interests, and by the Credito Italiano at Milan, are exempt from the payment of imposts, etc. On the other hand, two new warehouses have been inaugurated in the Free Port Duca d'Aosta, and one in the Free Port Vittorio Emanuele III. However, the programme of harbour improvements at Trieste includes the following works:—

1. The construction of five warehouses on Molo VI. in the Free Port Duca d'Aosta with a total area of 34,000 square metres, including two floors with the object of exploiting them for exports by sea;
2. The construction of railways, etc., on this mole;
3. The construction of warehouse No. 70 with an area of 4,400 square metres with the corresponding unloading facilities, etc., in the Free Port Duca d'Aosta;
4. The reconstruction of the wooden warehouses Nos. 51 and 53 in the Free Port Duca d'Aosta.

The programme includes the construction of a maritime passenger station, and the erection of a new warehouse in the Free Port Vittorio Emanuele III., and the increase of several floors on some of the existing warehouses besides the construction of the appropriate unloading and railway facilities corresponding to these warehouses.

The programme which has been worked out by the Azienda dei Magazzini Generali is, on the other hand, fully justified, when it is taken into consideration that the progress of Trieste shipping which has been noticed in the course of the last quarter of 1928 has continued also during the period from January to March, 1929, when shipping reached 718,163 tons against 581,501 tons during the corresponding period of 1928.

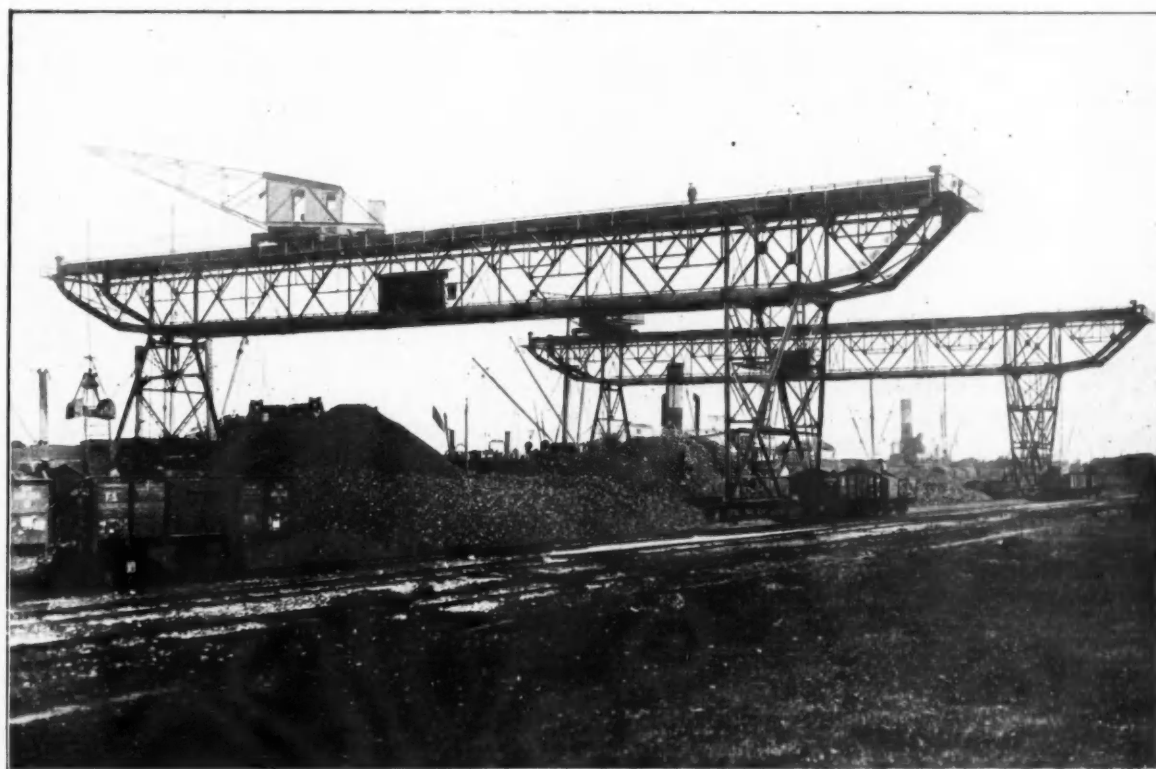
The situation at Venice has not been less favourable when it is considered that total shipping during the period from January to March, 1929, included 630,006 tons against 620,859 tons, an increase of about 10,000 tons, due practically to the progress of exports such as pyrite ashes, textiles, fertilizers, wheat, marble, sugar and rice.

These figures are undoubtedly the results of the work undertaken by the Provveditorato del Porto di Venezia with the view of increasing facilities and cutting down expenses. In the course of 1928 an additional twelve electric cranes and other unloading facilities were provided. The construction of a new concrete warehouse has made further progress.

## Developments at Italian Ports.



New Cranes on the Warehouse No. 62 in the Free Port Duca d'Aosta, at Trieste.



New Electric Coal Elevators in the Port of Venice.

The construction of the large maritime passenger station at the Molo Beverello at Naples has just been started, while a credit of 18 million lire has been allowed for harbour improvements at Fiume, and a credit of 20 million lire for the enlargement of the Port of Ancona. According to information secured in various quarters this credit has to be employed particularly in the construction of breakwaters to ensure the safety of the waters in the inner harbour, and the construction of new piers with warehouses and electric unloading facilities. A fishing port has also to be built at Ancona. These works have to be started in the course of next July.

## Irish Harbour Matters.

### IMPROVEMENTS IN CORK HARBOUR.

Welcoming seven new members appointed by the Corporation, Mr. R. Wallace, chairman of the Cork Harbour Board, said that directly and indirectly the Board controlled the administration of £395,000. Last year their revenue from the port amounted to £83,000. The Port of Cork had been prominent in the shipping of the world since the Act was passed in 1820 right down to the present. Before steamships arrived there were counted at one time, in one day, in the harbour no fewer than 365 sailing ships. During the steamship era, Cork had more than held its own, and within the last two decades the port had advanced considerably.

To-day, he said, there was accommodation in Cork's navigable channel for steamers drawing 27-ft. of water. For their dredging plant and its maintenance they owed a great deal to their engineer, Mr. Price, and when the schemes he had in hand at present were finished, within two years, they would have accommodation for steamers with a draft of 30-ft., to be afloat at the south jetties. They had replaced many of the timber wharves with concrete wharves, and the Tivoli reclamation scheme was advancing, as well as the new roadway. Owing to the energies of the Board in the last decade, they had five or six acres of land available for the erection of factories or warehouses.

A letter from the Department of Industry and Commerce announced that the Minister had appointed Mr. E. J. Egan, B.L., to hold an inquiry into the matter of the proposed new Pilotage Bye-laws, and asking the Board to give an undertaking to defray the expenses of the Inquiry.

The Board granted the application of Messrs. Henry Ford and Son, Ltd., for permission to erect eighteen dolphins at the eastern end of their wharf; and to make a new wharf extension at the western end.

### NEW TRANSATLANTIC SERVICE.

The White Star liner "Albertic," a vessel of 19,000 tons, has been allocated to the service which has been inaugurated between Liverpool, Boston and New York, calling at Belfast and Glasgow to pick up passengers. This vessel will call on its west-bound voyages—about once a month—at Belfast Lough and the Clyde. Previously, passengers had to travel to Liverpool or Derry, but they are conveyed by tender from a new harbour landing stage opposite the Co. Down Railway Station, and put on board the liners as they lie at anchor in Belfast Lough, off Carrickfergus.

### SOME BELFAST LAUNCHES.

The s.s. "Deebank," the first of eight vessels which Messrs. Workman, Clark, have on order for Messrs. Andrew Weir and Co. for their Bank line, was launched at Belfast on the 24th April. This vessel is of the shelter deck type, built to Lloyd's highest class, her dimensions being: length 436-ft.; beam 56-ft.; depth to shelter deck 36-ft. 3-in.; and she has a displacement of 13,000 tons.

Messrs. Workman, Clark, Ltd., have also launched from Belfast the cargo and passenger vessel "Agamemnon," built by them to the order of Messrs. Alfred Hobb and Co., Liverpool. This vessel has a length of 475-ft., beam 59-ft., depth 35-ft. 3-in., while she has a displacement of over 15,000 tons.

As the third of five similar vessels ordered from Messrs. Harland and Wolff, Ltd., by Messrs. H. and W. Nelson, Ltd., for their service to Brazil and the Argentine via Spain and Portugal, the new twin-screw passenger and refrigerated cargo motorship "Highland Brigade," left Belfast for London on her official trial trip. The new vessel has a gross tonnage of 14,130 and is propelled by twin screw Harland B. and W. double-acting four-cylinder cycle motors. Her principal dimensions are: length (B.P.) 520-ft., breadth 69-ft., to upper deck 35-ft. 9-in., and accommodation is provided for 135 first-class and 66 intermediate class passengers, as well as for a large number of emigrants.

The second of the three shallow draft oil tankers which they are building for the Lago Shipping Co., Ltd., the s.s. "Ule," has been launched by Messrs. Harland and Wolff, Ltd., from their East Yard, Belfast. She is similar to the "Temare," also launched from this yard, her principal dimensions being: length 335-ft., breadth 55-ft., gross tonnage 3,240. She is propelled by two twin-screw triple-expansion engines, steam being generated in two cylindrical boilers burning oil fuel on White's system under natural draught.

### THE MOTOR YACHT "IKONA."

The motor yacht "Ikona" (late "Planta Genista"), which Major O'Sullivan purchased from Mr. Huet, was launched from the dockyard at Dunleary by Mr. Mahony during the month. This is the first motor cruiser proper to go in the water at Kingstown. She has good accommodation inside and an all over length of about 40-ft. Her power is supplied by a 30-h.p. Atlantic motor.

### NEW STEAMER FOR B. AND I. SERVICE.

The British and Irish Steam Packet Company have now added to their fleet for the rapid transit of live stock between Dublin and Liverpool the s.s. "Lady Meath." This is a well-modelled steamer fitted with two sets of triple expansion reciprocating engines, constructed by Messrs. John G. Kincaid and Co., Ltd., Greenock, and is capable of maintaining her speed of 14 knots in average weather. The "Lady Meath" is 321-ft. in length by 40-ft. beam, and is 1,597 tons gross. She was built under the special survey of the British Corporation for the Survey and Register of Shipping, and is fitted to carry 800 cattle and 1,350 sheep.

### THE S.S. "ASSAROE," LATE "YARROW."

Under the flag of the newly-formed Dublin and Sillith Steamship Co., Ltd., in connection with the London and North-Eastern Railway, the s.s. "Assaroe," late "Yarrow," made her first trip from North Wall, Dublin, to Sillith and the Isle of Man on the 2nd May, with a full cargo. Mr. John Cassidy is chairman of the new company, which is largely controlled by the Irish Live Stock Exporters' Association. The managers are Palgrave Murphy, Ltd.

### FROM GALWAY TO AMERICA.

The first direct sailing from Galway to the United States took place on the 5th May, when the 20,000 ton liner "Scythia" called there en route for Boston and New York from Cobh (Queenstown). This vessel will also call from Galway on June 2nd, and on her return voyages from New York on May 18th and July 11th the "Scythia" will call at Galway to land American tourists before proceeding to Liverpool.

### THE BANN ENTRANCE.

The tender of £68,746 for carrying out navigation improvements at the Bann entrance, submitted by Messrs. F. Moore and Co. has been accepted by the Coleraine Harbour Board. The original works, completed in 1882, cost £66,000, and during recent years a good deal of silting has taken place.

## Launch of H.M.S. "Perseus."

At the Naval Construction Works of Messrs. Vickers-Armstrongs, Ltd. at Barrow-in-Furness, on the 22nd May, Mrs. Fisher, the wife of Vice-Admiral W. W. Fisher, C.B., C.V.O., launched the first of the four "P" class submarines building by the Company for the British Admiralty under the 1927/8 programme. It will be remembered that six "P" Class submarines were ordered, four from Vickers-Armstrongs, Ltd., one from Cammell, Laird & Co., Ltd. and the other from Chatham Dockyard.

As is customary with submarine launches, the ceremony was of an informal character, but there was a good muster of officers of the British and other Navies, and the principal officials of the Barrow Works, with their wives, to see the vessel safely into the water, and to wish her good luck in her career.

Immediately after the launch, the guests returned to the general offices for light refreshments, which took the place of the usual lunch.

The particulars of the "P" class submarines are, of course, secret, but it may be taken for granted that these vessels embody the experience accumulated by the Admiralty with the earlier post-war types of boats, and are in every respect powerful and efficient additions to the defence of the country.

The "Perseus" is the first vessel of its class to be launched, and Vickers-Armstrongs, Ltd., have a record to be proud of in this respect, as their position as the premier submarine builders in Britain, if not in the world, has been recognised by the British Admiralty entrusting them with the construction of the first submarine of nearly every class built for the Navy. The "Perseus" is the 153rd submarine launched from the Barrow Yard, five of which are now at the fitting-out berth.

In addition, there are three "P" Class and three "R" Class boats on the stocks.

### NEW YACHTING FACILITIES FOR "LE TOUQUET."

In about 2 years time Le Touquet Paris-Plage, the famous French seaside resort, will be able to accommodate the largest yachts afloat. The yacht harbour is being built in the estuary of the River Canche, and will cost £96,000. It is estimated that the maintenance of the outer channel will cost £800 a year.

## Notes from the North.

### LANDING STAGE CHARGES.

Revised charges for the use of Prince's Landing Stage, Liverpool, are to be introduced by the Mersey Docks and Harbour Board. They are in respect of the use of the Prince's Stage by passengers embarking or disembarking on or from ocean-going steamers, whether direct or by tender, as follows: Saloon and second class—Adults from 2s. 6d. to 2s.; children from 1s. 3d. to 1s. Third class—Adults from 9d. to 8d.; children from 4½d. to 4d.

### SUNDAY WORK AT LIVERPOOL DOCKS.

For some years Sunday work, unless under special circumstances, has been prohibited at the Liverpool Docks. This action was initiated shortly after the war when the wages which had to be paid by shipowners and others for Sunday dock work were very high. One result was that some men, while willing to work on Sunday for the big rates of pay, were not so ready to present themselves for work on the other earlier days in the week. In the circumstances the Dock Board adopted by-laws which forbade Sunday work on vessels in the docks, unless foodstuffs, or mails were involved, and except a special application was made and permission granted. Notice has now been given by the Mersey Docks and Harbour Board to repeal, as from 1st June next, the by-laws that were approved by the Minister of Transport in May, 1920.

### PRESTON DOCK LIGHTING.

The question was asked at the Preston Town Council meeting when the Ribble Committee was going to consider the use of electricity at the dock instead of spending money with the gas company. The promise was made some two years ago that the engineer would draw up a scheme for the use of electricity for power purposes at the dock, but no such scheme has yet been produced. Alderman Hudgson replied that an electricity scheme had been considered time after time by the Ribble Committee, but it had not been possible to carry it out on account of the necessity of using steam. The question of electrical lighting of the dock would, no doubt, receive due consideration at some future time.

### CONTRACT FOR CHESTER.

The Hydraulic Engineering Co., Ltd., of Chester, have secured an order from the Great Western Railway Company for two large movable hydraulic coal hoists and wagon traversers for Alexandra Dock, Cardiff. The hoists will be some of the largest ever made and each will be able to raise a wagon of coal of a gross weight of 30 tons, to a height of 60-ft., and then tip the wagon to the necessary angle to empty it. The hoists are made so that they can travel along the quay side, and arrangements are made so that full and empty wagons can be worked on and off the hoists cradle by means of a traverser, which will have tilting tables so arranged that a full wagon will be propelled towards the hoist and the empty wagon towards the empty wagon line. The Hydraulic Engineering Co., Ltd., have previously supplied coal hoists to the Great Western Railway Company, and since the war have erected four at Cardiff, two at Swansea, and two at Penarth, but in each case these were fixed hoists and not movable as in the present instance.

### FLEETWOOD SEA WALL.

After a stern struggle of more than 18 months, success has crowned the efforts of the Fleetwood Council to safeguard the town against flooding by the sea. The main sea defence wall on the West side has just been completed. The work, which consisted of the construction of a stout concrete wall along the vulnerable position of the coast, was commenced in September, 1927. The wall stretches a distance of more than 1,900 yards and is capable of withstanding a tide of 38-ft., about 6-ft. higher than the one which overwhelmed the town nearly two years ago. Some 13,000 tons of concrete have been used in the work. Simultaneously, the groyning of the foreshore has been carried out, and the west beach now presents a fine, sandy expanse. The work has been carried out to the designs of Messrs. Lewis & Lewis, consulting engineers, London, under the direct supervision of Mr. Melville, the Council's engineer and surveyor. The construction of the bull-nose coping and a promenade behind the wall is now going ahead and will probably be finished during the present year.

### NEW MANCHESTER S.C.C. DIRECTOR.

At the May meeting of the Manchester City Council, Councillor W. R. Mellor was appointed a director on the Manchester Ship Canal Company in place of the late Alderman Plummer.

### NEW FOUR-FLOOR SHED.

Another new shed is to be erected at Gladstone Dock, Liverpool. In the minutes of the Dock and Quays Committee of the Mersey Docks and Harbour Board, submitted to the meeting of the Board, held on April 25th, it was stated that a letter was read from Messrs. Alfred Holt and Co., requesting that a

shed measuring 300-ft. by 100-ft. be erected on the dock side of the roof of the middle section No. 4 of the shed at the berth appropriated to the use of the steamers of the Ocean Steamship Co., Ltd., and the China Mutual Steam Navigation Co., Ltd., jointly, at the south side of the Gladstone Branch Dock No. 1, at a cost of £13,314. Reports on the matter were read, and memoranda of the Works and Finance Committees and of a meeting of the chairmen of the committees on the subject having been submitted, it was resolved to recommend that the shed be erected on the dock side of the roof of the middle section of the shed mentioned, as suggested by the engineer at an estimated cost of £13,314, and that when completed the shed be part of the appropriation subject to certain terms and conditions. Mr. A. W. Bibby said it might be interesting to those members who were not on the committee to know that when the Gladstone Dock and sheds alongside were being constructed, there was a good deal of doubt and opposition to putting on three storeys. Now it was found not only that three storeys paid very amply, but they were putting on a fourth.

### SLUICING AT BRUNSWICK DOCK.

Further improvements to Mersey dock works are about to be undertaken by the Mersey Docks and Harbour Board. This briefly is in the nature of an important sluicing experiment with the object of saving, if possible, a very large expenditure. The Marine Committee has obtained the authority of the Board for the engineer to extend for experimental sluicing purposes, at the Brunswick Dock river entrances, the existing pipe from the old South Toxteth entrance sluice for a distance of approximately 100 feet at an estimated cost of £3,500. At a previous meeting of the Board a report was submitted from the engineer stating that, as the existing pipe from the South Toxteth entrance sluice was not of sufficient capacity to feed any additional sluicing pipes, it would be necessary, in order to provide additional efficient sluicing arrangements at the south side of the Brunswick Dock river entrance, to instal another pipe from the North Toxteth entrance sluice at an estimated cost of £13,649. He suggested, however, that as an experiment the existing pipe at the old South Toxteth entrance sluice be extended so as to provide discharge some 100-ft. to the southward of the town sluice. It was explained that by means of this experimental operation it was hoped to render unnecessary the carrying out of a much larger plan. There was a considerable hole to the north of the South Jetty where the sand accumulated and which was sluiced, and it was thought that if that hole could be made to go to the south about 100 feet, it would make the dock entrance very much more accessible for the larger ships that used it. If afterwards it was decided to go into a greater sluicing scheme, the pipes that were being put in at present would be part of the new scheme, so that the £3,500 spent would not be thrown away; part of the apparatus could be used up for the larger scheme. The Marine Committee were very hopeful that with this extension the larger scheme might be postponed for some considerable time.

### VISITORS FROM OVERSEAS.

The Liverpool dock system was inspected on April 29th by a delegation representing the American Ocean and Inland Ports and Harbours Organisation. The party was composed of Major C. L. Tilden (president of the Board of State Harbour Commissioners of San Francisco); Mr. W. S. Gilman (representing the Governor of Ohio); and Mr. J. W. Pacey (South Nyack-on-Hudson, New York). Under the guidance of Colonel Hawkins (assistant general manager of the Dock Board) and Colonel Ainley (assistant chief traffic manager), the visitors toured the South docks, and afterwards viewed some of the North docks and warehouses. The following day the delegation inspected the Manchester Docks and subsequently travelled to Hull, then to London and the chief Continental ports.

### OPERATION OF BIRKENHEAD DOCK BRIDGES.

Dissatisfaction with the system of operating the dock bridges on the Birkenhead side of the River Mersey was voiced at the May meeting of the Birkenhead Chamber of Commerce, at which it was decided to make representations to the Mersey Docks and Harbour Board. Mr. J. C. Hignett (chairman of the Transport Section) said trade was seriously hampered at times, especially at month ends, by the working of the bridges on the Dock Estate, causing traffic hold-ups. One member had submitted a concrete case when on April 26th he was held up from 3.40 p.m. until 4.7 p.m., during which he counted 150 vehicles and 250 pedestrians also held up. It was felt that these stoppages were growing and that some of them were very serious, especially when there was a rush of traffic. If goods arrived just after the time of receiving, it threw expense on forwarding agents and shippers, to the annoyance of exporters, whose goods had to wait sometimes four to eight weeks. The Transport Section suggested that the Chamber should get into touch with the Mersey Docks and Harbour Board to point out the disabilities under which local transport was labouring, and ask that the blockages be minimised as

much as possible. In connection with the Duke Street bridge, the Section were advised that shortly the present bridge would be superseded by a cantilever bridge that would carry all types of vehicles. Unfortunately the final stages in the erection of the new bridge would involve a total stoppage of all traffic passing over Duke Street bridge between Wallasey and Birkenhead. As the interference would extend over three or four weeks it was a serious matter, and the Transport Section asked the Chamber to solicit the co-operation of the Dock Board to the extent of giving the public of Birkenhead as long a notice as possible before the event, and also to give the Chamber an opportunity of conferring with the Board afterwards with the object of devising ways and means whereby the dislocation would involve the least inconvenience to transport. When the Duke Street bridge was closed there was no direct communication between Wallasey and Birkenhead except by the Four Bridges. Mr. A. S. M'Ivor expressed the view that the Chamber should be represented on the committee which the Dock Board would form to make arrangements, as they did on another occasion when the Board invited the railways and certain carting agents to discuss a similar matter. Mr. M. Pike suggested that any difficulties would be greatly lessened by a signalling system between the Duke Street bridge and the Four Bridges, so that a rush of traffic at one point could be diverted to the other.

#### NEW BIRKENHEAD BRIDGE.

The new cantilever bridge for the present swing bridge over the Duke Street passage, Birkenhead, will be constructed by Sir William Arrol & Co., at a cost of £59,794. The present swing bridge, spanning the Duke Street passage, is out of date and is hardly in accord with modern traffic needs. The Mersey Docks and Harbour Board came to the conclusion, therefore, that the rolling bascule, or cantilever, would be the best type of bridge to erect. The bascule principle of bridge-making allows the structure to lift on a vertical plane, whereas the swing bridge revolves on a horizontal plane and, consequently, takes up a bigger area of space when it is "off" the passage. The bascule is cheaper to operate, is stronger and will take modern engine loads and heavy traffic engines. The work of constructing the new bridge will be in progress for some considerable time before it is necessary to interfere with the present swing bridge. Even when the new bridge has been built, a lengthy period must elapse before it will be needful to remove the old one for the purpose of actually "dropping" the bascule into position.

#### MERSEY TUNNEL PROGRESS.

At the May meeting of the Mersey Tunnel Committee, the Joint Engineers, Messrs. Basil Mott and J. A. Brodie, reported on the progress of the tunnel borings. It was stated that the estimated value of the work accomplished to date on Contract 2 (the construction of the iron-lined under-river tunnel) was £412,146, the contract amount being £1,413,601. The work was in active progress and the enlargement of the headings to the full-sized tunnel was proceeding at 10 working faces. The total volume of excavation done was 92,000 cubic yards, or 35 per cent. of the total 260,000 cubic yards in the contract. Of the cast iron lining there were now in place 16,500 tons, or 31 per cent. of the total of 52,600 tons in the contract. The number of men now employed on this contract was about 600. Approval of the Ministry of Transport has been received to the award of the contract for the full size tunnel on the Birkenhead side to Messrs. Edmund Nuttall, Sons and Co., Ltd., and work above and below ground is in preparation.

#### TENDERS ACCEPTED.

At the meeting of the Mersey Docks and Harbour Board on May 9th, the following tenders were accepted:—Works Committee, nails and screws, etc., Child and Hewitt, Ltd.; iron and steel, Thomas James and Co.; steam warping capstans, Emerson Walker, Ltd.; linsced oil, James Light and Son, Ltd.; girder rails, P. and W. MacLellan, Ltd.; and cleaning, painting, etc., G. M. Hayward.

#### GOOD TURNOVER.

Fish valued at £1,542,958 was brought into Fleetwood during the year 1928. This is an increase of £9,000 on the previous twelve months.

#### NEW BROMBOROUGH DOCK.

Messrs. Lever Bros., of Port Sunlight, who are building a new dock at Bromborough, have placed with Messrs. Vickers Armstrong, Elswick Works, Newcastle, the order for the hydraulic equipment for the entrance lock of their new dock at Bromborough. The lock gates of the dock are now in course of manufacture by Messrs. Vickers Armstrong at their Barrow Works. At the thirty-fifth annual general meeting of the shareholders of Lever Brothers, Limited, held at Port Sunlight, Mr. Francis D'Arcy Cooper, the chairman, announced that the capital expenditure included £161,149 spent on the Bromborough Dock, which is now nearing completion.

#### IMPROVED ACCOMMODATION FOR IRISH SERVICES.

In connection with the shipping services of the Ulster Imperial Line, the new title which has been assumed by the Belfast Steamship Company, three new motor express steamers bearing the names of "Ulster Monarch," "Ulster Queen," and "Ulster Prince," and built by Messrs. Harland and Wolff, will shortly be displacing the older type of steamships on the Liverpool Belfast service. These three sister ships of 3,800 tons each, with a length of 345-ft., breadth of 46-ft., and a depth of 16-ft., will be the largest cross-Channel motor vessels in the world. These new ships have too great a beam for the Prince's Dock entrance, Liverpool, and the sheds there are not sufficient for the company's increasing business. Consequently the Mersey Docks and Harbour Board is spending nearly £100,000 in widening the dock entrance and enlarging the sheds.

#### ROUND HOUSE TO DISAPPEAR.

Work is well in hand for the preparation of the Clarence Dock site for the new riverside power station of the Liverpool Corporation. A familiar landmark is about to disappear, namely, what was known as the Round House, which has been used as a dockmaster's office and tide bell, at the passage to the Clarence inner dock. The work of demolition has already been commenced.

The Prince's Dock has been pumped clear of water to enable the dock entrance to be widened. Improved shed accommodation is also being provided. In its present state the dock presents a very derelict appearance and has had an intriguing interest for passengers travelling by the overhead railway, whence they get a bird's eye view of operations.

#### CROSS RIVER BRIDGE.

There has been a conference between representatives of the Widnes Council and the Runcorn Council regarding a permanent vehicular bridge over the Mersey. On both sides of the river there is felt to be a need for better facilities for crossing the Mersey as a highway between Lancashire and Cheshire. The transporter bridge is a profitable concern, but the Widnes Council realises that they must look ahead and they therefore invite the co-operation of the Runcorn authority. If the higher authorities decide that the movement for the provision of a new bridge is necessary, Widnes will encourage the idea, but will safeguard the present transporter undertaking.

#### EGREMONT FERRY.

Repairs are about to be carried out at the Egremont Ferry, Wallasey. Up to about 20 years ago there was only a short pier at Egremont built over a stone jetty, along which steel rails were laid. Along these rails ran an adjustable landing carried on wheels and so arranged that it could be lengthened or hauled in by machinery according to the state of the tide. In 1908 a scheme of improvements was carried out, the pier lengthened to 600-ft. and a floating landing stage provided. As the result of damage to the steel part of the structure it suffered from the effects of wear and tear and corrosion, and it is now considered necessary to embark upon another stage of modernisation. A design incorporating a new and wider passenger bridge, the stiffening of the end of the pier and the construction of a new landing stage, moored in position by eight heavy anchors and cables, was prepared by Sir John Wolfe Barry and Partners, of London. The contract for the work was obtained by Messrs. Cleveland Bridges and Engineering Co., Ltd., of Darlington, for a sum of £28,000. The assembly of the parts, which are being mainly constructed at the contractors' Darlington works, was commenced in January last, and unless delayed by unforeseen circumstances, the reconstructed landing will be open for use in the early part of next summer.

#### PUTTING CRANES IN THE SINK.

Two five-ton cranes, well oiled and greased, were deposited in the bed of the Clarence Dock, Liverpool, on May 15th. Onlookers not in the "know" stood aghast while the operation was being performed, and speculation was rife as to the reasons for this perplexing procedure. The explanation is quite simple. The action was part of a well-thought-out plan to lower the cranes ready for excavation work after the Clarence system was run dry. The Mersey Docks and Harbour Board high-powered crane Titan was worked into the dock and gently lifted the smaller cranes and lowered them into position. The cranes are now in position ready to assist in the preliminaries for the new riverside power station. Without this unorthodox procedure considerable work would have been necessary to lift the cranes.

#### A GOOD PERFORMANCE.

Discharging a steamer at the rate of 423½ tons per hour was the feat accomplished by Messrs. Rea Limited, at Liverpool, on May 15th. The steamer "Porthcawl" was loaded with 3,388 tons of phosphate rock and this was discharged into barges at the company's jetty at Birkenhead. The four cranes worked from 8 a.m. until 5 p.m.

# New Fitting for Dock Trucks.

## Elevating and Stacking Gear.

**T**O the range of electric trucks specially suitable for transport on the quays and in the dock sheds, there has just been added another new unit, the outstanding feature of which is the merit of the attachment for the elevating and stacking of loads. This has been put into service by the Portage Department of Elder Dempster and Co., Ltd., shipowners, at the West Toxeth Dock Shed, Liverpool. It may be

for the supervision and surveillance of the mechanical cargo handling plant, has devised an ingenious arrangement whereby common faults with stacking machines are overcome.

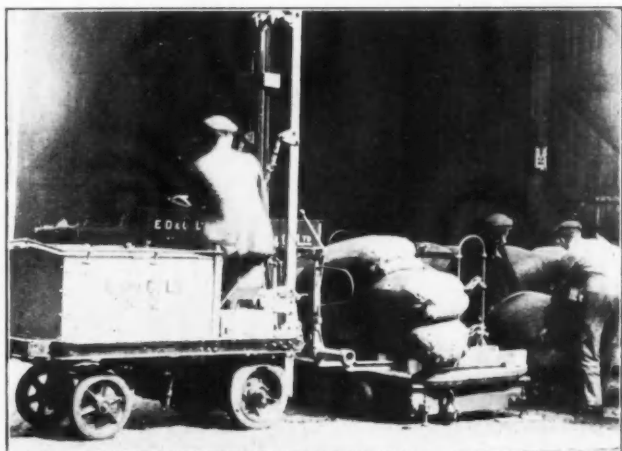
We are all familiar with the ordinary type of elevating platform truck, which although a very useful vehicle, has certain disadvantages when applied to dock or warehouse work. In the first place it is impossible to place the load on top of a pile owing to the platform elevating within the



Operation No. 1: Slings of five bags being received at the ship's side on hand trucks.

remembered that in a recent issue of *The Dock and Harbour Authority*, we published a survey of this firm's mechanical cargo handling plant, in the course of which it was pointed out that for several years, this firm has been doing a great deal of experimental work in the evolution of designs of trucks, particularly suitable for the transport in the dock sheds of such miscellaneous goods as come from the West Coast of Africa, principally bagged produce, palm oil, logs of timber and hides, and generally suitable for all classes of traffic.

The function of transport, however, is only one operation of cargo handling on the quays. Another, and this is of almost equal importance, is that of stowage. Unless this is undertaken in an orderly and systematic manner and with due regard to the economic employment of the limited floor space, the consequences can be readily imagined, especially when several gangs are working from each of the four or five hatches of a steamship or motor ship. For the clearing of inward cargoes from the ship's side, a fleet of 22 electric trucks is employed, in addition of course, to a substantial amount of manual labour.



Operation No. 2: Hand trucks convey the bags to the scale, whence the remaining transport is cleared by electric trucks. Here the Lansing truck is seen taking up a load.

The Portage Department, which is in charge of Mr. C. E. Childs, has just put into commission a Lansing electric truck which has been adapted to carry an attachment for the elevating and stacking of miscellaneous goods. This is the invention of Mr. H. Lovelady, who as the engineer responsible



Operation No. 3: The truck clearing the load from the scale.

wheelbase; consequently labour has to be used to unload the goods after elevation. Further the machine cannot be employed to pick up a load off a scale, for instance, without the use of more or less cumbersome stillages or loose platforms. Another difficulty experienced has been to keep a stacked load such as of bags or bales, on the platform without the tendency for them to be thrown off when the vehicle is travelling round corners or over rough ground. A mechanical weakness lies in the necessary use of very small wheels at the front end, in order to allow of the platform being as near as possible to floor level, and even then the platform top is usually 12-in. off the floor.

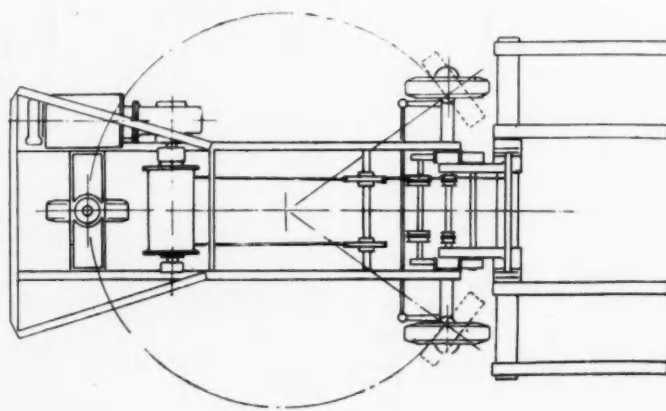
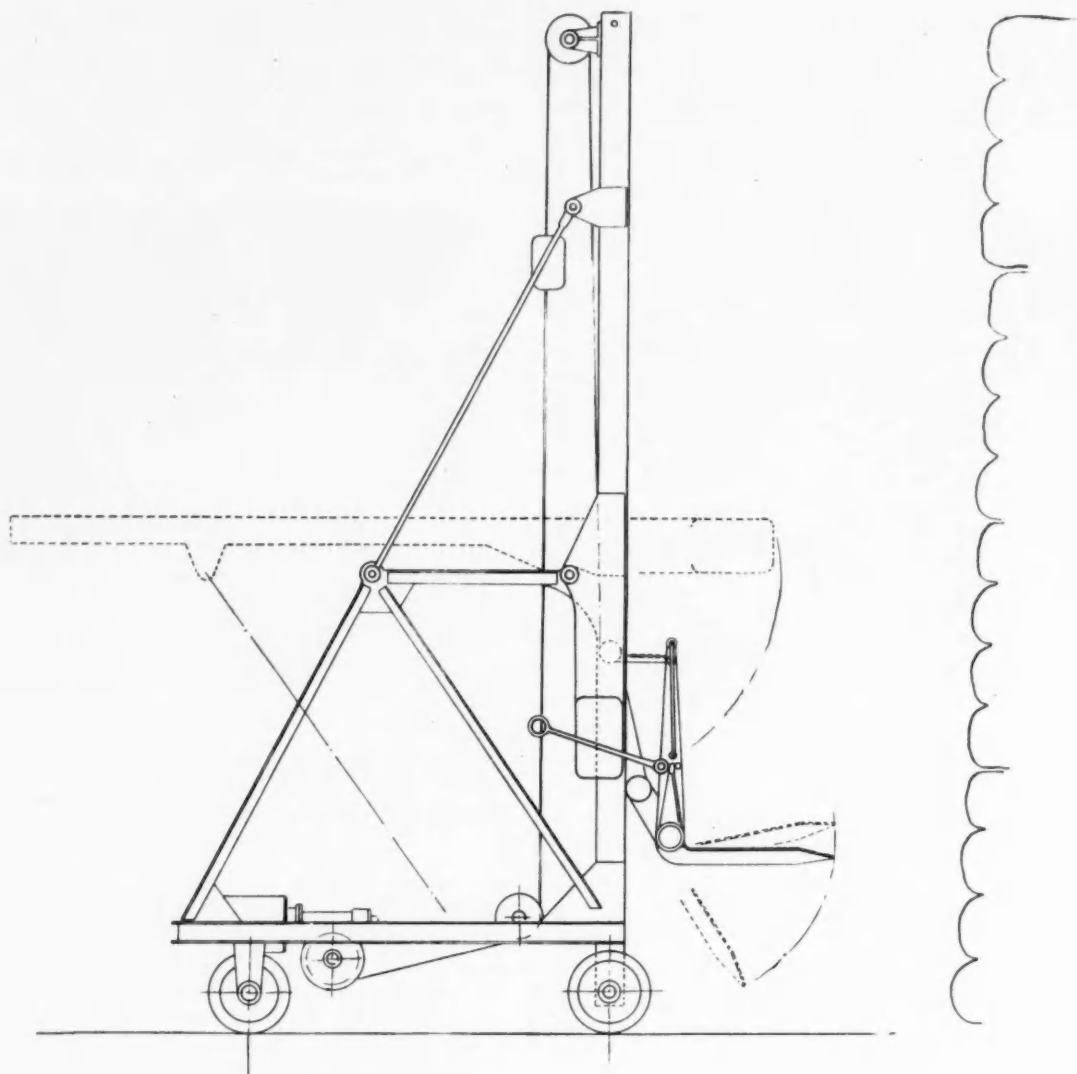
All the above disadvantages have been successfully eliminated in the design of vehicle which we have seen in operation at the West Toxeth dock berth of Messrs. Elder Dempster and Co., Ltd., Liverpool. The load platform is made of arms in a fork formation. This platform is elevated in channel guides carried on the end of the chassis, at the driving end of the vehicle the height of the guides being determined by the height to which the goods have to be stowed, in the case of Messrs. Elder Dempster and Co., Ltd.,



Operation No. 4: The truck in transit.

6-ft. 6-in. It is possible to provide for the vertical guides being hinged down from this height to allow the whole vehicle to pass through a normal doorway, but in this case the hinged portion is counter-balanced, so that the driver can perform this operation by himself in a matter of a few minutes. A lifting motor of  $\frac{3}{4}$  h.p. at 48-volts, complete with a solenoid operated

### Elevating and Stacking Attachment for Dock Trucks.



Showing the design of the new attachment now used on electric trucks at West Toxteth Dock, Liverpool.  
Type B. 1, 10-15 cwt. hand or power travelling and slewing motions.

brake, worm reduction gear and lifting barrel, is fitted on the guides. Where it is a matter of convenience the operating controller may also be attached. The whole gear is so arranged that it can be constructed as a unit and attached to any type of vehicle, hand propelled or mechanically propelled, without the necessity of any chassis alterations.



Operation No. 5: The truck at the pile, showing the position of the truck and load immediately before the latter is dropped.

An important feature of the elevating gear is that it is counter-balanced in such a manner that the return springs for re-setting are quite small and the energy absorbed in elevating the gear only is just sufficient to overcome the normal frictional losses in the worm gear pulleys, etc. In the absence of this counter-balance, fully 22½ per cent. of the battery energy would be absorbed in elevating the dead weight of the gear only, during a normal day's work.

When goods—bags of cocoa or kernels, etc., or bales of African cotton, hides, etc.—are slung overside they are placed on a scale and weighed and marked. A sling of bagged produce consists of five bags which in the case of kernels, weigh 7 to 8 cwt., cocoa 6½ cwt., whilst bales of cotton average 420 lbs. each. The scale is fitted with battens so that the driver of the truck can run up the scale with the fork arms between the battens. After operating the lifting controller, the first action of the gear is to tip or incline the load rearwards. This is achieved by the forked platform being mounted pivotally on a sub-frame, and after the load has inclined approximately 20 degrees, the gear automatically starts to elevate. When the load is clear of the scale the driver then moves off to the pile.

Our representative observed the working of this truck whilst the motor ship "Adda" was being discharged. The load was set well back on to the frame in such a position that it was impossible for it to be thrown off by quick turning or on the rough ground. On the way to the pile, the driver continued the elevating motion to the desired height and then drove in till the load was about 6-in. above the lower tiers. By pulling a trip lever on the side of the gear the whole of the forked platform was caused to tip forward, thus sliding the load off



Operation No. 6: The load deposited. The truck now backs out and is ready for another journey.

into the exact position required, without any further handling. It took three seconds to lift and clear the load off the scale, 2½ seconds to run to the pile 50 yards away, and five seconds to stack the load 5-ft. 6-in. off the ground.

With two machines in operation it is possible to select on landing, weigh and stow eight and nine high on the quay, a

matter of 2,600 bags per day with only the necessity for two stowers who are engaged to lay out the marks and tidy up the piles.

The elevating unit described can lift a maximum load of 15 cwt. The same type of elevating and stacking gear can be fitted to an ordinary three-wheeled carriage for use in warehouses, the motor in this case being supplied with current through a flexible cable. The same motor can be arranged to drive the whole machine along the floor by means of dog clutches and a roller chain. If necessary the vertical guide bars can be arranged to hinge down, against counter-balance weights, for the purpose of passing through low doorways, etc., while the forked platform can be modified to deal with any class of goods. At the present time the new patented attachment is fitted to a Lansing truck. Five other conversions are being carried out, four with Lansing trucks and one with a Greenbat.

Undoubtedly in dock sheds and warehouses there is a great field for a machine of this class, eliminating as it does, so much handling in the "top" stowing of goods. There must be many openings for the application of a gear of this description for loading lorries and wagons.

To show the method of working an inward cargo from a ship through the channels of quay portage and the savings that mechanical cargo handling have brought about, perhaps we cannot do better than to explain the two systems in vogue at West Toxeth Dock, Liverpool, (a) man handling, (b) electric trucking. A gang of 25 men working with hand trucks will clear about 2,200 bags of nut seeds, etc., per day. Their dispositions would be: two slingers, two selectors, two scale loaders, one weigher, one clerk, one marker, one puller-off, six truckers, eight stowers, and one foreman. Four of the stowers would pile bags 5-ft. high and four 10-ft. high. The wage bill for the gang for an 8-hour day would be £15 10s.

Let us now see how costs work out with electric trucking. It is essential to have two men to receive the bags from the ship's derrick, two men to sort the bags, two men to feed the bags to the scale, the weigher, clerk, and marker. From this point the economies begin. Two electric trucks are easily able to do the work of six men with hand trucks and these can be operated we believe at about 18s. per day (excluding driver's wages but including operating maintenance and overhead expenses) assuming a 250 working day year. Furthermore, only two men need be stationed on the dump to receive the bags and to superintend their orderly arrangement. Thus the gang comprises only 12 men, whose pay would be £7 14s. From the standpoint of output, further advantage can be claimed for the electric elevating truck. A pair working together under above conditions and each carrying a draft of five bags can clear 2,600 bags per day. An average increase of 400 bags over hand operation.

## Harbour Engineering Notes.

### IRON OXIDE FOR GAS PURIFICATION.

One of the most important operations in the manufacture of coal gas for industrial and domestic gas is the removal of all tar, heavy oils and ammonia, which is effected in the scrubbers and condensers, and also of the sulphur compounds, in the forms of sulphuretted hydrogen and carbon bisulphide and carbon dioxide, though in some cases it is not considered economical to remove the last compound. The sulphur compounds are removed in the purifying boxes.

The material used in these purifying boxes is iron oxide, and excellent results have been obtained during recent years with a form of iron oxide in the condition of a hydrated sesquioxide, obtained by treating oxide of iron in contact with carbon at a suitable temperature. This material has a peculiar spongy texture, caused by the loss of volatile matter, which, separating from the ore, leaves minute cells and places throughout its entire mass, with the result that it is left very sensitive to chemical action.

Before this material is placed in the purifier boxes, it is usual to spread a thin layer of sawdust, coke breeze or ashes on the bottom tray, spreading burlap over the whole surface. This is to prevent the tar vapours from coating the material, as they tend to lower its efficiency. In placing the purifying material in the boxes, it is generally spread in two layers, from 15-in. to 20-in. deep.

The iron oxide is easily revived by exposure to the air. On removal from the boxes it is coloured dense black, and, in from two to four days, the original reddish brown colour reappears and the material has regained its chemical properties.

### CORROSION IN CENTRIFUGAL PUMPS.

During recent years British manufacturers of centrifugal pumps have given considerable attention to the question of corrosion of the pump parts, particularly in underground pumping service, where in some cases corrosion is particularly heavy. Where pumps handle chemicals or liquids containing

chemicals the causes of corrosion are easier to determine. For instance, a centrifugal pump shaft of Monel metal, for handling sulphuric acid of 1.06 specific gravity, was only in operation for two months, and then broke. The casing and impeller of the same pump were made of bronze free from zinc, and were undamaged.

Aside from the corrosion which must take place when pumps are used on liquids of this type, there is the question of mechanical corrosion, and an interesting case is afforded by the cast steel impellers in a large 1800 h.p. high-lift centrifugal pump. To facilitate machining of the passages in the guide wheels, these wheels were made in two parts. Under the very high pressure at which the pump operated, water was forced into the joint between the two parts in the overflow passages, thereby wearing through the joints. The water handled by the pump contained a certain amount of carbonic acid, so that the mechanical corrosion was aided by chemical action. The trouble was cured by constructing the guide wheels in one piece and of bronze.

The great majority of cases of corrosion on underground pumps is, however, due to combined mechanical and chemical action, especially where the water handled contains air or other gases. This corrosive action is explained by Messrs. Sulzer Bros. as follows: The small air bubbles separated out from the water adhere firmly to the material, and the oxygen contained in them combines with the metal. The water flowing over the affected part washes out the oxidation, thereby providing still more favourable points for corrosion. Other air bubbles immediately settle there and further oxidation occurs, which is again washed away, and so the process continues indefinitely until the metal is rendered useless. If the metal is impure or non-homogeneous the action proceeds more rapidly. It is found that the more resistant metals, such as a good bronze, oxidise much less readily than iron.

One factor which has been found to favour corrosion is a high suction head, because the greater the vacuum generated the more air is freed from the water, and if there is carbonic acid present as well, rapid destruction of the metal is inevitable. Again, if the water is flowing at a high speed, corrosion is accelerated.

For this reason corrosion is found to be the greatest at the ends of the impeller blades and tips of the guide wheels. Eddy currents also, which are produced where the water passes from the impeller into the guide wheel, increase corrosion. In multi-stage pumps it is generally the rule that only the first impeller is attacked, while those in the remaining stages remain almost entirely unaffected.

The explanation of this feature of corrosion can only be that there is a vacuum at the inlet to the first impeller and that this causes air to separate out from the water, while the other impellers work under a certain pressure so that no air is separated out from the water they handle. As a general rule corrosion of this type is not found in pumps to which water flows under pressure.

For example, a bronze guide wheel from the first stage of a five stage high-lift centrifugal pump after delivering water continuously for 15,200 hours, had the impeller of the first stage corroded at the tips of the blades, while there were no traces of corrosion in the other stages. The same kind of corrosion was found on the bronze plates of the front covers of the suction side of the same pump. The suction head was about 20-ft.

In the case of pumps with cast iron impellers, for instance, it was found that the impeller in a two-stage boiler feed pump working at a pressure of 240 lb. per sq. in. and running at 2600 r.p.m., which was constructed during the war, proved quite unsuitable for the high pressures and speeds at which it had to operate. After three months' service it broke down altogether. Some of the heavily-corroded blades were broken and the boss of the impeller was eaten away to such an extent that it resembled a sponge. Corrosion occurred in this case in spite of the water reaching the impeller under pressure, the air being separated out from the water by strong eddy currents.

Sulzer Bros. recommend that the best means of eliminating corrosion is to fit an air chamber with an air separator before the pump, the air liberated being removed by an ejector or air pump. In other cases the pump can be installed, if possible, so that the water enters it under pressure.

More unusual, but just as dangerous, is the corrosion caused by electrolytic action, which is found mainly in pumps handling waters containing acids or salts. The following case is of interest.

Four Sulzer pumps were installed for handling water; two low-lift pumps, each delivering 15,400 gallons per minute against a head of 47-ft. for supplying water for cooling in a steam turbine plant, and two medium-lift pumps, each delivering 6,000 gallons per minute against a head of 175-ft.

These pumps had to handle sea water and this fact was considered when they were built, the impellers being constructed of bronze bushing. An easily replaceable tongue, made of zinc-free bronze, was fitted in the spiral casing, which was made of special cast iron, and bronze rings were fitted in the impeller where the water passed from it into the casing.

After two months' service severe corrosion was found in the medium-lift pump at the tips of the impeller blades. In the cast iron casing the machined surfaces to which the bronze tongue was fixed, were eaten away.

These phenomena can be attributed to electro-chemical action, and may be explained as follows: All conductors of electricity can be arranged in a certain order, the so-called contact series, in which the precious metals are at one end and the commonest at the other. For instance, the following is the order of a few: Magnesium, aluminium, zinc, iron, tin, nickel, copper, silver. Two different metals in the series constitute a galvanic element when dipped in an acid, basic or salt solution, and the difference of potential is the greater the further apart the metals are in the series. In addition to that, the difference of potential depends on the liquid in which they are placed.

If the two metals are directly connected to each other, a short-circuited galvanic element is formed and a current starts flowing which, according to Ohm, is directly proportional to the difference of potential and inversely proportional to the resistance of the circuit. In addition to the metals, the liquid in which the metals are immersed acts as a conductor of current. The direction of flow of the current through the liquid is always from the less precious metal, the negative element, towards the more precious electro-positive element; and in the "outer circuit" it flows from the positive to the negative pole.

The metals forming the galvanic element are at the same time subject to chemical decomposition. If an electric current flows through a conducting liquid of the kind mentioned above, the chemical changes which take place cause the molecules of the liquid to decompose, and the resultant products separate out and are deposited on the metal plates. In many cases oxygen and hydrogen are produced, the former at the positive pole and the latter at the negative pole. If the liquid contains a chloride salt, chlorine is generated at the positive pole, and hydrogen at the negative. The chlorine produced in this manner is much more corrosive to metal than chlorine produced by a purely chemical process. The combination it forms with metals are soluble in water. The hydrogen, on the other hand, acts as a reducing agent and therefore acts as a protection to the metal on which it is produced.

Of the two metals forming the elements of a cell, one is chemically decomposed, i.e., the one forming the negative pole. If, for example, a vessel contains a solution of ordinary salt, and two plates, one of iron and the other of copper, the iron plate will be eaten away by the chlorine, while the copper plate will be kept bright by the hydrogen.

It is more difficult to explain the severe corrosion at the ends of the blades of an impeller, but here again it may be assumed that the cause is to a large extent due to electrolysis.

In the case mentioned, in order to eliminate corrosion, the whole casing was made of a bronze free from zinc, and since then no trace of corrosion has been found either on the casing or on the tongue. The corrosion of the impeller did not stop, however, though it was much less severe, and the impellers were not rendered useless until they had run for about 5,500 hours. The conclusion to be drawn from this is that the impellers are subject to a combined chemical and mechanical action, as well as to electrolytic action due to the gas liberated, its action being increased by strong eddy currents. In this case it was impossible to prevent the formation of eddies, as the pump was always operated throttled and the impeller was only designed to give half the output, which was sufficient when the plant was started. It is to be assumed that corrosion will no longer take place when a normal sized impeller has been fitted to give the full output.

It is of interest to note that the low-lift pumps in the same station, which in design and material are exactly similar in construction to the medium-lift pumps, showed no trace of corrosion.

#### ENGLISH STEEL CORPORATION, LIMITED.

Mr. J. Beaumont Nielson, C.A., a partner in McClelland Ker & Co., chartered accountants, and Deputy Chairman of Baldwins, Ltd., has joined the Board of the English Steel Corporation, Ltd.

#### HAMBURG SHIPPING TRAFFIC IN APRIL, 1929.

A report received by the Department of Overseas Trade from His Majesty's Consul-General at Hamburg states that compared with the previous month there was a further increase of 104,000 tons in the total tonnage entered at the port in April and of 156,000 tons in the tonnage cleared.

British shipping in April amounted to 204 vessels (410,149 tons) entered and 209 vessels (420,476 tons) cleared, compared with 200 vessels (417,166 tons) entered and 193 vessels (367,534 tons) cleared in March.

German tonnage in April amounted to 814,807 tons entered (692,258 tons in March) and 855,896 tons cleared (718,780 tons in March).

Personal enquiries regarding shipping and transport matters should be made at the City Office of the Department (Shipping and Transport Section), 73, Basinghall Street, London, E.C.2.

## The South Australian Harbours' Board.

### Annual Report, 1927-28.

#### FINANCIAL.

The comparatively poor harvest of 1927-28, with the corresponding reduction in the purchasing power of the community, is partially reflected in the Board's accounts for the year under review. A decided falling off in shipping and imports was experienced towards the end of 1927, and, coupled with the grain shortage, resulted in gross earnings for the year reaching only £662,406 2s. 6d., compared with £701,326 11s. 10d. in 1926-27. Vote expenditure totalled £172,506 9s. 5d., being £7,211 8s. less than the previous period. The net balance transferred from Revenue Account to Profit and Loss was £489,899 13s. 1d. Interest on Loan Fund (including estimated interest on unsettled claims) absorbed £343,760 10s. 7d. and £30,000 was charged to Depreciation, leaving a net credit of £159,007 17s. 10d. for the year, while the accumulated credit balance since the Board's inception is £542,227 4s. 9d. The foregoing figures are arrived at after adjustments of interest on resumption claims, which in previous years have necessarily been estimates only. Interest accordingly varied as the settlements effected exceeded or failed to reach the estimated amount of compensation on each acquisition.

#### MAINTENANCE.

In order to assist the Treasury the Board again reduced its maintenance charges below what was considered should have been usefully and economically expended. This item totalled £59,325 15s. 9d. against £69,932 17s. 1d. for 1926-27. It is anticipated that these severe economies will result in heavy replacements at no distant date, and the Board has applied for a more liberal vote for the year 1928-29.

#### CONTROL OF FUNDS.

The Board is considerably hampered in its work by reason of its working expenditure being limited, not by the demands of an efficient service, but by the exigencies of the State's financial position.

Although the past year evidences a falling off in tonnage of cargo and shipping, yet there has been a big forward movement since 1920-21, and there must naturally be a proportionate increase in the working costs of the ports if the public are to be given the services for which they are paying.

The apparent intention of the Harbours Act and the recommendation of the Royal Commission that preceded it was to create an administrative body to run, improve, create, and manage South Australian harbours, but not to limit its usefulness by restricting unduly its spending on necessary work to what the needs of the other State departments may leave to spare for harbours.

#### REVIEW OF FINANCIAL RESULTS, 1914-1928.

Some fourteen years having elapsed since the inception of the Board, it is now possible to take a survey of the progress made. When the Board was created in 1914 it was vested under the Harbours Act, with all the property of the Crown in harbour works, lighthouses and magazines. There had been expended on these to the 30th June, 1914, as far as is revealed by the State records, approximately £3,274,347.

In keeping with the peculiar system of accounting then in vogue at the Treasury, no depreciation had been written off for the wasting that was regularly occurring in all constructional work.

As the Board is required by the Harbours Act to show its assets at their fair value, it was necessary to take debit for the actual estimated value of the assets at the time of taking over by the Board. A schedule of valuations was prepared and adopted by the Board after having been duly approved by the Hon. the Controlling Minister, the total valuation of the assets in this schedule being £2,522,084. In the writing down there had been £345,423 written off the reclaimed area at the Outer Harbour, which it was found, on analysing the cost of the work, had amounted to £2,707 per acre. This was considered to be far in excess of its intrinsic worth. Some years later this writing down was challenged by the Auditor-General, on whose representations Cabinet directed the Board to take debit for the full original cost of the reclamation. The commencing valuation of the whole of the assets was accordingly adjusted to £2,921,367. On the amount the State had invested in maritime works up to June 30th, 1914, the Government derived a net return of less than 2½ per cent., against which interest at 3½ per cent. on £2,883,923 was being paid on the money borrowed for these works.

The establishment of the Board coincided with the great drought and the beginning of the Great War, the result of which, combined with the taking over of the unprofitable maritime concerns of the State, was a loss of £90,637 in the first year. Losses continued on a decreasing scale to the 30th June, 1919, by which date the accumulated deficit was £334,235 5s. 6d. The corner was then turned, and the profits of the new concern—made possible by the acquisition of the

privately-owned wharves and by a readjustment of the tariff with an increase in charges to meet the higher costs of materials and labour—commenced to appear regularly.

No provision was made in the earlier years for depreciation. Although the Board from the beginning recognised the need for this provision, and was successful in getting recognition of the principle in regard to the wasting of certain jetties formerly in railway hands, it was denied any provision in its Vote Expenditure until 1923-24, when, instead of £50,000 for which the Board applied, only £15,000 was granted.

While the Harbours Board has not control of its own finances—the Harbours Act requiring all its earnings to be paid into Consolidated Revenue—and while it has been hampered by the fact that the money available for improvements is limited by the demands of other spending departments, it is not claimed that as much has been achieved in the direction of modernising its ports as the Board had hoped; nevertheless, it is manifestly clear that considerable success has attended its work in stopping the drift and in converting the unprofitable maritime investment of the State into a substantial profit-earning business.

Since 1914 about two million pounds has been expended in acquiring wharf and water frontage properties at Port Adelaide and Port Pirie, while on deepening Port Adelaide, Port Pirie, and other outports, the erection of new piers at Thevenard, Lincoln, and Wallaroo; new wharves at Glanville, Osborne, and Outer Harbour, together with substantial additions to the dredging fleet and numerous small works at outports, a further two and a quarter millions has been expended, making the total capital debt approximately £7,295,000 bearing interest at 5.05 per cent. The Board's accounts, as recently published, show in 1926-27, after providing for interest on capital expenditure, £330,610; Sinking Fund (provision for depreciation), £30,000, a credit of £160,998 10s. 1d. Accounts for 1927-28 have been submitted for audit showing a further profit for the year of £159,007 17s. 10d. This includes an adjustment of interest over-estimated on outstanding acquisition claims. The balance at date at the credit of Profit and Loss totals £542,227 4s. 9d. after writing off £165,000 for depreciation, in addition to which the Sinking Fund investment stands at £116,299 13s. 7d.

Claims aggregating £3,781,931 received from some 150 owners of wharves and harbour frontages at Port Adelaide and Port Pirie have been dealt with. Of these only seven were referred to arbitration, and the whole of the settlements have been effected for the sum of £1,977,446.

At Port Adelaide the deepening of the channel by a further 4-ft. to 27-ft. l.w.s. tides and widening to a minimum of 400-ft. is well in hand. Several vessels drawing over 28-ft. have loaded in Port Adelaide and successfully navigated the inner harbour channel to the sea. So soon as this deepening and widening are completed it is reasonable to expect that vessels of 30-ft. draft and over will take advantage of the inner harbour wharves, where provision is being made to berth vessels of this type always afloat.

An important feature in connection with the deepening is the reclamation of the whole of the river frontages on the west side for distances varying from 500-ft. to 2,000-ft. back. All this land is being made available on reasonable terms for industrial enterprise. This must have a very beneficial effect on the trade of the main port of the State, and be reflected favourably also in the Board's finances.

The erection of coal-handling appliances was begun in 1925. These will be equal to handling the whole of the coal imports. Unfortunately, the contract is long overdue for completion, and certain defects discovered in the wharf necessitate its being remodelled, with the result that the improved despatch of colliers and reduction in cost of handling coal is further postponed.

#### RESEARCH WORK.

The future work of the Board should benefit extensively from the research work carried out by two members of its staff—Messrs. F. Andres, Dip. C.E. (Zurich), and R. Ross (Officer in Charge of Osborne Wharf Reconstruction). This has been particularly directed to the question of soil properties, carrying capacity of piles, impermeability and fluidity of concrete, and resistance to sea water. Invitation has been given to local cement manufacturers to produce an iron cement—thus avoiding foreign importation—and with the view to obtaining resistance to certain chemical deterioration in the concrete.

The failure of concrete in so many harbour works elsewhere is calling for closer attention than has been given in marine works generally, and good results are expected from the local investigations. It is claimed that these investigations have gone further than in any other Australian port. It is gratifying to note that the work of Messrs. Andres and Ross has attracted the attention of other harbour engineers, to whom the Board will make available the results of their research.

#### NO. 2 QUAY.

Just prior to the end of the financial year the Board was in hopes of being able to bring into full use the new 30-ft. berths at No. 2 Quay North, which were approaching completion. This wharf was constructed in the dry some 130-ft. back from the old water frontage on the north side of the quay, but when the dredging of the enlarged basin was nearly

completed, evidences of defects in the steel sheet piling were first discovered. Investigations by diver were then put in hand; a member of the Board's engineering staff also descended and made careful notes of the conditions under water. The sheet piling has split, bent, and become distorted during the process of driving—causing large cavities to be formed by erosion—the interlocking bar being quite unequal to holding the steel joist portion of the piling in position.

#### OSBORNE COAL-HANDLING PLANT.

Owing to defects discovered in the timber wharf at Osborne, plans were prepared for its amendment. The remedies were very costly, and the Government invited the Chief Engineer for Railways to submit counter proposals. These, upon careful investigation were rejected by the Board, and the Government then called in Mr. A. J. Gibson, M.C.E., M.Inst.C.E., M.I.E. (Aust.), Consulting Engineer of Sydney, to report on both schemes.

Some seven months after the Board's plan was prepared, authority was given to proceed on that design, the Consulting Engineer having reported to the Government that both economically and technically the Board's design was the superior.

This unfortunate delay, coupled with other setbacks beyond the control of the Board, has necessitated the devising of some temporary means of placing the coal from colliers at Osborne on the conveyor belt system, and these have been brought into operation since the end of the financial year.

#### FEDERAL WHARF, PORT PIRIE.

One of the results achieved by the rebuilding of the Federal Wharf, Port Pirie, and providing a depth of 24-ft. l.w.s. tides is that it enables larger vessels to load full cargoes at the wharf instead of having to lighter to the anchorage. One vessel which recently loaded 10,000 tons of ore saved £750 in lighterage on, say, 2,000 tons, which, formerly, would have had to be placed in lighters, towed to the anchorage and there transhipped at considerable cost.

Wharfage on the whole cargo of ore at 1s. per ton plus 40 per cent. represents £700, so that the saving in lighterage alone more than suffices to pay the wharfage on the whole parcel in the ship.

This meets the Board's conception of the objectives of a public utility, viz., not merely to operate for profit, but to reduce the costs of transport where possible, which is so very necessary where Australian products have to compete in overseas markets.

#### VALUATIONS.

It has been suggested by the Auditor-General that valuations of the Board's assets should not be made by members of its staff.

Exception is taken to this because no directions are given these officers; neither have they any incentive to arrive at any other than a correct valuation.

There is so much underwater and underground work involved that actual personal knowledge of the conditions is essential on the part of any valuator to whom this work is assigned.

The suggestion that an outsider is required to do this work satisfactorily is, in view of this, astounding, and the more so as business concerns value their own stock and plant; and unless there be evidenced a distinct attempt to inflate or deflate the figures the auditors accept them as correct, assuming that the proprietors' business acumen and desire to know the facts are sufficient warrant for the figures.

#### OVERHEAD EXPENSES.

Notwithstanding a general reclassification scheme under which most salaries throughout the Public Service were increased, the Board's overhead charges have been reduced from 3.885 per cent. in 1920-21 to 3.076 per cent. in 1927-28—or about a 20 per cent. decrease.

#### STAFF.

In the absence of a third member of the Board all its formal meetings have been attended by the Chief Engineer (Mr. R. de N. Lucas).

The Board records its high appreciation of the loyalty and fine work of the staff during a year of considerable worry and anxiety.

#### REGULATIONS.

Regulations dealing with the following matters were made by the Governor in Council on the recommendation of the Board:—

- Varying previous regulation relative to limiting weights of vehicles on wharves;
- Varying regulation relative to haulage charge on motor vehicles;
- Opening of Jervois Bridge.

#### AVERAGE RATES OF WHARFAGE.

The following scale shows the average wharfage rates paid per ton on cargo passing over the Port Adelaide wharves for the years 1918-19 to 1927-28:—

	Cargo (tons).	Wharfage Collected.		Average rate per ton.
		£	s. d.	
1918-19	1,538,699	120,562	7 11	1 6.81
1919-20	1,959,514	148,273	7 11*	1 6.16
1920-21	1,961,256	197,332	11 3†	2 0.15
1921-22	2,085,085	200,904	10 10	1 11.12
1922-23	2,004,856	211,476	17 0	2 1.26
1923-24	2,303,759	252,541	1 2	2 2.309
1924-25	2,478,741	271,831	10 4	2 2.32
1925-26	2,388,778	282,306	9 3	2 4.36
1926-27	2,739,348	317,127	3 7	2 3.784
1927-28	2,459,797	283,114	18 3	2 3.623

\* Wharfage rates raised by 20 per cent. on October 16th, 1919.

† Further 20 per cent. increase, making 40 per cent. in all, on August 25th, 1920.

#### AVERAGE RATES OF WHARFAGE FOR OUTPORTS, YEARS 1926-27 AND 1927-28.

PORT PIRIE.					Average rate
Cargo (tons).		Wharfage Collected.			per ton.
		£	s.	d.	s. d.
1926-27	... 1,055,715	60,599	13	2	1 1.77
1927-28	... 1,199,267	71,403	1	8	1 2.29
ALL OTHER OUTPORTS.					
1926-27	... 859,204	58,404	18	9	1 2.61
1927-28	... 838,065	53,269	7	7	1 3.25

#### WORKS.

##### MAINTENANCE.

During the year the wharves at Ports Adelaide and Pirie and the wharves and jetties at the various outports have been kept in workable condition, the following places receiving special attention:—At Port Adelaide: The Copper Co.'s Wharf, No. 1 Quay, North Parade Wharf, Ocean Steamers Wharf, and McLaren Wharf. At Port Pirie: The Barrier Wharf, and jetties at Kirtan Point, Port Lincoln, MacDonnell Bay, Second Valley, Venus Bay, Ardrossan, Victor Harbour, Port Broughton, Port Hughes, Point Turton, Price, Largs Bay, Glenelg, Grange; also the wharf at Renmark. The tramline at Dry Creek was also overhauled and repaired.

The maintenance of the light beacons and buoys in the Port River and entrance; also Port Augusta and Franklin Harbour channels, was performed as usual. The back lead of No. 11 Inward leading lights, Port Adelaide, was changed from white to red in order that these leads might be more easily distinguished. The changing of the gas cylinders of the various A.G.A. lights around the coast and a cable survey from Cape Jervis to Kangaroo Island for the Telegraph Department was also carried out.

##### CONTRACTS IN HAND.

Port Pirie, Federal Wharf Reconstruction.—The reconstruction of this wharf departmentally is now well in hand, over half the contract having been completed.

Outer Harbour—Widening No. 1 Shed.—This work is now in progress.

Port Lincoln Shipping Pier.—The approach to this jetty has now been widened; the work of raising the superstructure to its original level and of renewing the piles is being performed.

Sheds at No. 2 Quay.—No. 1 shed has been completed and the construction of No. 2 shed is in hand.

##### CONSTRUCTION.

Port Adelaide.—The north-west corner of No. 2 Quay was reconstructed and the wharf at the east end completed. Mooring piles are now being driven at intervals behind the concrete wharf.

At Birkenhead Wharf the stacking area behind No. 5 shed was concreted; at Musgrave Wharf a shed was erected and a road laid through the Pipe Works; and at Jervois Bridge the dolphins, which had been badly damaged, were re-erected. Two new jetties—one for the Commonwealth Oil Refineries, Limited, and the other for the British Imperial Oil Company (now known as the Shell Company)—were constructed during the year, the former being built by the company itself; at the basin the north side of the T-head wharf was reconstructed; and three dolphins erected at and repairs made to the Explosive Mound, Port Adelaide River.

Outer Harbour.—The widening of Nos. 2 and 3 sheds and erection of a shed for the Adelaide Stevedoring Company have now been completed.

Port Pirie.—Three new boilers for the coal gantries were made and installed during the period, and drinking fountains provided on the wharves.

Wallaroo.—On the 1st August, 1927, the new shipping pier was brought into use. A coastal berth, with 18-ft. l.w.s.t. on the inner end of the head, together with three berths of 26-ft., 27-ft. and 28-ft. l.w.s.t. on either side of the jetty; a swinging basin of 24-ft. l.w.s.t. on each side, have been dredged; and an all-round green flashing light at the sea end of the pier has also been provided.

Stansbury.—During the year leading lights (A.G.A.) were established at this port.

Port Lincoln.—The erection of a house for the jetty attendant and an office for the Harbour Master was completed.

Price.—During the year a residence for the Harbour Master and stables were provided.

Port Vincent.—Stacking area metalled and fenced and leading lights (A.G.A.) established.

Lipson Cove.—Alterations to tramline and repairs to jetty effected.

Cutter and Shaft for No. 4 Dredger.—Work completed and delivered.

Chains for Dredgers.—These chains have now been delivered.

No. 3 Quay.—Dredging in connection with this extension is in hand, and the adjacent land is being reclaimed.

#### SURVEYS.

Port Adelaide, Osborne, and Outer Harbour.—Bores set out at No. 3 Quay and Osborne Wharf; site for proposed slip Birkenhead surveyed; report, plans, and evidence on South Australian Company v. Minister of Marine prepared and compiled; surveys were made of the boundary railway land, Outer Harbour, and of the shoal patch opposite Torpedo Station.

Cape Jervis.—Report made on Reserve.

Walleroo.—Survey made of Harbour.

Venus Bay.—Survey made of islands.

Franklin Harbour.—Channel surveyed.

St. Kilda.—Survey made of proposed embankment.

Loveday Bay.—Survey completed.

Murray Mouth.—Position of A.G.A. light surveyed.

Throughout the year numerous surveys were made and plans prepared in connection with leases, land grants, etc.

A large amount of sounding and levelling work was also performed and various valuations made.

#### DEEPENING.

The work performed by the Board's dredgers during the year was as under:—

No. 1 Bucket Dredger.—Deepening berths at Wallaroo, raising 148,800 cubic yards; deepening berths at Whyalla for Broken Hill Proprietary Company, raising 30,150 cubic yards; deepening at Port Pirie, opposite Barrier and Federal Wharves, raising 86,650 cubic yards. Total amount raised, 265,600 cubic yards, deposited as follows:—258,950 cubic yards to sea and 6,650 cubic yards to No. 9 dredger for depositing behind sheet piling, new Federal Wharf.

No. 2 Suction Dredger.—Deepening and reclaiming at No. 2 Quay, 152,980 cubic yards handled, including dumped material; deepening and reclaiming at Snowden's Beach, 111,941 cubic yards, handled, including dumped material. Total amount handled, 264,921 cubic yards, all pumped ashore for reclamation, and of which 189,450 cubic yards were dumped material.

No. 3 Bucket Hopper Dredger.—Deepening at Wallaroo, raising 17,150 cubic yards; deepening at Port Lincoln, raising 26,920 cubic yards; deepening at Whyalla for Broken Hill Proprietary Company, raising 25,180 cubic yards; deepening at Commonwealth Oil Refineries Wharf, raising 8,250 cubic yards; deepening at T-head Basin, raising 5,500 cubic yards; deepening at Birkenhead Wharf, raising 3,120 cubic yards; deepening 60-ton crane berth, raising 420 cubic yards. Total amount raised, 86,540 cubic yards, of which 16,480 cubic yards were dumped to No. 2 dredger, 240 cubic yards to No. 4 dredger, 570 cubic yards ashore, and 69,250 cubic yards to sea. This dredger was under overhaul for one and a half months.

No. 4 Suction Dredger.—Deepening and reclaiming at No. 3 Quay. Amount excavated and pumped ashore, 6,300 cubic yards. Dumped material pumped ashore, 264,343 cubic yards, making a total of 270,643 cubic yards for the period. This dredger was under overhaul for three weeks.

No. 5 Bucket Dredger.—Deepening at Explosives Berth, raising 6,575 cubic yards; deepening north of Osborne Wharf, raising 7,410 cubic yards; deepening opposite Torpedo Station, raising 6,500 cubic yards; deepening opposite No. 12 Leads, raising 55,150 cubic yards; deepening at No. 2 Quay, raising 136,475 cubic yards; deepening at Commercial Wharf, raising 28,950 cubic yards; cleaning up at British Imperial Oil Company's Wharf, raising 10,850 cubic yards. Total for period, 251,910 cubic yards, disposed of as follows:—127,700 cubic yards dumped to No. 4 dredger; 118,240 cubic yards dumped to No. 2 dredger; 4,820 cubic yards ashore, and 1,150 cubic yards to sea. This dredger was under overhaul for two and a half months.

No. 6 Bucket Dredger.—Deepening between Nos. 3 and 4 beacons, raising 28,550 cubic yards; deepening opposite No. 10 leads and four mile post, raising 133,710 cubic yards; deepening opposite Mutton Cove, raising 70,950 cubic yards; deepening at Outer Harbour, raising 43,920 cubic yards; deepening at Texas Oil Company's berth, raising 49,250 cubic yards. Total raised for period, 326,380 cubic yards, of which 128,710 cubic yards were dumped to No. 4 dredger, 53,900 cubic yards to No. 2 dredger, 3,500 cubic yards to land, and 140,270 cubic yards to sea. This dredger was under overhaul for five weeks.

No. 8 Bucket Dredger.—This dredger was out of commission whole of the period.

No. 9 Grab Dredger.—Dredging at Wallaroo, raising 9,976 cubic yards; deepening at Whyalla for Broken Hill Proprietary Company, raising 1,795 cubic yards; deepening opposite Federal Wharf, Port Pirie, raising 315 cubic yards; landing dumped material behind sheet piling, new Federal Wharf, Port Pirie, 6,650 cubic yards handled for period. Total amount handled for year, 18,736 cubic yards, of which 12,086 cubic yards were dumped to sea and 6,650 cubic yards ashore, as above. The dredger was under repair for three weeks.

No. 3 Priestman Crane.—Cleaning up and assisting in construction work at various wharves. During the year raised 9,743 cubic yards, of which 4,948 cubic yards were dumped to No. 4 dredger, 3,245 cubic yards to shore, 200 cubic yards to No. 2 dredger, and 1,350 cubic yards to sea. This crane was out of commission two and a half weeks.

No. 4 Priestman Crane.—Coaling dredging plant and dredging at No. 2 Quay, raised 1,557 cubic yards; all deposited behind sheet piling, No. 2 Quay. This crane was out of commission four months.

No. 6 Priestman Crane.—Cleaning up at various wharves, raising 6,960 cubic yards, of which 2,745 cubic yards were dumped to No. 4 dredger, 630 cubic yards to No. 2 dredger, 1,780 cubic yards to sea, and 1,805 cubic yards ashore. This crane was out of commission five months (pontoon condemned).

The total amount raised by all dredgers was 1,049,194-yds., of which 548,821-yds. were placed ashore for reclamation.

#### DRAWING OFFICE.

The drawing office staff has been fully engaged during the year in preparing drawings, estimates, specifications, and quantities in connection with the various works proposed and in progress. Preparation of plans, quantities, and estimates in connection with arbitration cases also engaged the attention of the staff.

### New Records at the Port of Montreal.

According to the Annual Report of the Montreal Harbour Commissioners, the port has achieved a number of new records during the past twelve months. The aggregate volume of freight passing over the harbour wharves in 1928 was 12,589,126 tons, an increase of 667,953 tons as compared with the 1927 total. Exports during the year are recorded as 6,838,108 tons, and imports as 2,543,685 tons. "Domestic" freight accounted for a total of 3,207,333 tons. Exports showed an increase over the year of more than 660,000 tons, but there was a decrease of 150,000 tons in imports due in great part to smaller receipts of British coal. "Domestic" tonnage increased by about 155,000 tons.

As usual, the major portion of the commerce in the harbour consisted of grain and grain products, these exports representing 50 per cent. of the grand total. Shipments of grain and grain products totalled 211,295,379 bushels, in addition to 15,250,000 bushels of wheat exported in the form of flour. This figure, representing traffic during a period of about seven months during which the port of Montreal is open, exceeds by a very wide margin the total for any previous season in the history of the port, and far exceeds that established at any ocean port in the world during a twelve-month period. Grain exports from the port of Montreal last year were consigned to no less than twenty-one different countries, the leading importers being Great Britain, the Netherlands, Germany, Italy and Belgium.

The total movement of coal into the port last year reached 2,161,968 tons, a decrease as compared with the 1927 total of 2,500,147 tons. It is interesting to note, however, that of this total, Nova Scotia bituminous coal represented a new high figure of 1,659,206 tons. There was a decline in imports of British anthracite, the 1928 total imports being 359,253 tons as compared with 683,090 tons for the previous twelve months.

The total number of ocean ships entering the harbour in 1928 was 1,607, as compared with 1,610 for the previous year, but the net registered tonnage was half a million tons more, totalling 5,494,062 tons. A larger decrease occurred in the number of vessels entering the port from inland navigation routes, although in this instance also there was a great increase in tonnage, the number being less by 315 and the net registered tonnage more by 1,360,000. The total number of ships entering the harbour, both ocean-going and inland, was 7,480, and the total registered tonnage 19,299,465, as compared with 17,322,444 tons in 1927.

Revenues collected by the port authorities totalled \$5,589,327, as compared with the 1927 total of \$5,453,951. This total has doubled during the past eight years, the 1921 figure having been \$2,891,274.

Customs and Excise revenue collected at the port during the fiscal year ended March 31st, 1929, was no less than \$105,462,183, as compared with \$99,755,119 during the previous year.

## The Port of New York.

### VALUE OF COMMERCE AT THE PORT.

Exports through the Port of New York for the third consecutive month of this year continued to show a marked increase in terms of dollar value. The latest available figures issued by the local office of the Customs Statistics Section of the United States Department of Commerce show that for the month of March, 1929, exports amounted to \$209,690,000 as compared with \$168,912,000 for March, 1928. This represents an increase of 24 per cent. for the month. For the first quarter of 1929, the value of exports from the Port of New York was 27 per cent. greater than for the same period in 1928. Compared with the Port of New York, the United States as a whole increased 16 per cent. for the month of March and 18 per cent. for the first quarter, indicating that the Port of New York is faring better than the average in the expansion of its overseas commerce.

Imports also continue to show an increase. For the month of March, 1929, imports through the Port of New York amounted to \$187,708,000 as compared with \$185,265,000 for March, 1928. Although the increase is not great, being only 1.3 per cent., the corresponding increase for all United States ports for the month of March amounts to less than 1 per cent.

An analysis of exports through the Port of New York for the month of February, 1929, showed that increases were again fairly well distributed among all groups of commodities, although again particularly marked among the group of manufactures. For the first two months of 1929, automobile parts increased by 60 per cent. over the corresponding months in 1928; iron and steel manufactures by more than 50 per cent.; paper, except printed matter, by more than 40 per cent.; industrial machinery by 38 per cent.; copper and manufactures by 32 per cent.; rubber manufactures, particularly automobile casings, by over 30 per cent.; and cotton manufactures by 29 per cent.

The heavy export movement of apples continues, showing for the first two months of 1929, an increase of more than 375 per cent. over the corresponding months of 1928.

### COMMERCE AT PORT NEWARK.

In March of this year, 44 steamers, lighters and barges entered Port Newark, bringing in 34,378 tons of general cargo and 22,138,000 board feet of lumber, as compared with 38 vessels in March, 1928, with a general cargo amounting to 34,124 tons and lumber amounting to 37,557,000 board feet.

### GRAIN MOVEMENT.

Figures furnished by the United States Department of Commerce on the movement of grain through the Port of New York for the month of February, 1929, show an increase of 45 per cent. over the corresponding month of last year. There were 8,546,000 bushels of grain exported through the port in February, 1929, as compared with 5,894,000 bushels in February, 1928.

Although the export movement of domestic wheat through the Port of New York for the first two months of this year ran lower than for the corresponding period in 1928, exports of coarse grains, especially corn, have expanded rapidly during January and February, 1929. Canadian grain moving through the Port of New York in the month of February showed an increase of 37 per cent. over the same month of 1928.

### EASTBOUND LIGHTERAGE IN THE PORT OF NEW YORK.

According to the records of the Atlantic States Shippers Advisory Board, eastbound lighterage in the New York terminal area for the first quarter of 1929 showed an increase of 6.1 per cent. over the corresponding quarter of the past year. In the first quarter of 1929, a total of 98,357 cars of eastbound lighterage freight were handled in the New York terminal area, as compared with 92,685 cars for the same period in 1928.

### TIDEWATER COAL RECEIPTS AT THE PORT OF NEW YORK.

In the first quarter of 1929, there were 116,678 cars of coal unloaded at tidewater in the Port of New York, according to the records of the Atlantic States Shippers Advisory Board. This is an increase of 8.8 per cent. over the first quarter of 1928 when 107,261 cars were unloaded.

### VESSEL MOVEMENTS IN FOREIGN TRADE.

There were 581 direct and indirect entrances and 606 direct and indirect clearances of vessels engaged in foreign trade in the month of March, 1929. Comparing these figures with 557 entrances and 584 clearances in March, 1928, it will be seen that both entrances and clearances show substantial increases.

The tonnage of vessels entering in March, 1929, amounted to 2,446,697, being larger by 82,722 tons than that of the preceding March. The tonnage of vessels cleared amounted to 2,611,358, and also showed an increase over the preceding March of 139,188 tons.

### STEAMSHIP SAILINGS.

After making due allowance for the longer month, March showed an approximate increase of 10 per cent. in foreign sailings over February. This increase was more or less general in all trade routes. Caribbean-Mexican sailings registered the greatest increase with 198 departures compared with 167 in February and 150 in January. Foreign cruises continue to dwindle as these vessels are drawn back into regular transatlantic summer service.

The greatest number of sailings in any one day during March took place on Saturday, the 16th, when there were 45 foreign and 51 domestic departures. Of the foreign, 19, including 1 tanker served the Caribbean-Mexican route.

### FOREIGN STEAMSHIP SERVICES.

Moore and McCormack, operators of the American Scantic Line, will operate a regular service to the new Polish port, Gdynia. Regular weekly sailings will be maintained. Under the terms of the contract negotiated with the Polish Government, through bills of lading will be possible to any point in Poland and to contiguous points in Russia, Rumania and Czechoslovakia. The Polish textile industry centred in the Lodz district will benefit by the new service, as under the contract, cotton rates to Danzig and Gdynia will be the same as to Bremen. The long rail haul from Bremen to the Polish mills will be eliminated.

The seven ships being Dieselized by the Shipping Board and allocated to the Roosevelt Steamship Company are being turned over rapidly to the operator. The "Defiance" sailed on April 25th on her maiden trip to Australia, and the "Galveston" arrived from dry dock on the same date. Pacific coast interests made a determined effort to obtain these vessels for operation out of the west coast ports.

The Agwi Line has embarked on an expansion programme. Contracts were recently placed for two fast, modern type ships for the Ward Line Havana service. An announcement has also been made that a new liner will be constructed for the New York—Porto Rico service.

Beginning with the sailing of the steamship "Rotterdam" on May 11th, the Holland America Line inaugurated a motor coach service to and from its piers in Hoboken and the Hotels McAlpin and Commodore in New York.

The Fabre Line announce that owing to the special interest manifested in the International Expositions at Seville and Barcelona, sailings of the steamers "Patria" and "Providence" from New York, May 18th, August 3rd and September 2nd will include Cadiz as a port of call.

Scarcely a month passes at the Port of New York without an example of extraordinarily rapid dispatch. The motor ship "Vulcania," of the Cosulich Line, returned to her dock at 2 p.m., May 3rd, from dry dock, loaded some 1,800 tons of cargo, 1,400 tons of fuel oil and 2,000 tons of water, and sailed at midnight with 1,300 passengers.

The Scandinavian-American Line, which has occupied the pier at the foot of 17th Street, Hoboken, for over 25 years, has leased Pier 2, Hoboken, formerly occupied by the North German Lloyd, and will occupy it on and after May 13th.

### INTERCOASTAL STEAMSHIP SERVICES.

Advices from Newport News indicate that the steamship "Pennsylvania" of the Panama-Pacific Line which was laid down late last August will be ready for launching in July and ready for service in October or November of this year. This will constitute an American shipbuilding record.

An arrangement has been negotiated between the Erie and St. Lawrence Corporation and the American Hawaiian Line for trans-shipment at New York on through traffic from Detroit to the west coast. The Diesel barges of the Erie and St. Lawrence Corporation are making the voyage from Detroit to New York in six days.

### HUDSON RIVER STEAMSHIP SERVICE.

The steamer "Ferdinando Gorgas," which was purchased by the Hudson River Night Line for operation in a new auto carrying service between New York and Albany and Troy will be ready for service on or about June 15th. It is now having oil burners installed and extensive alterations made in its superstructure. It will operate from New York on Monday, Wednesday and Friday of each week, with Saturday service when required.

### FERRY CAR OR TRAP CAR SERVICE.

Many shippers of less than carload lots to or from shipside or industries do not realize the extent to which the railroads provide for the use of ferry cars at the Port of New York. Practically all of the rail carriers provide in their tariffs for ferry car service on l.c.l. lots to and from warehouses, industrial plants or piers served by rail sidings. The industries and piers with rail connections on the New Jersey waterfront can obtain this trap car service. Piers and industries on the Brooklyn waterfront which have track connections with the Bush Terminal, Jay Street Terminal, or New York Dock Railway, and industries on the west side line of the New York Central on Manhattan also have trap car service.

No extra charge is made by railroad companies for this service when the aggregate weight of the l.c.l. lots reach 6 tons. For lesser amounts, a charge of \$4.50 per car is assessed. On intercoastal shipments via steamship lines docking at piers served by track connections on the Jersey City or Brooklyn waterfronts, a charge of 5 cents. per 100 pounds is made by the steamship company. Allowing for this, shippers can make material savings in cartage costs on the movement of less carload lots. Anyone interested in more details regarding this service should communicate with the transportation companies or with the Bureau of Commerce which will be glad to answer specific inquiries.

#### NEW YORK STATE BARGE CANAL.

Excessive rain has prevented shippers from taking advantage of the early opening of the State Barge Canal this year. Flood waters, impeding navigation on account of low bridge clearances and strong currents, have not sufficiently subsided to permit movement through to Buffalo, although the canal is open to Syracuse and Baldwinsville. As of May 10th, it is reported that the canal should be open within a few days. Approximately 150 vessels with a capacity sufficient to lift about 12,000,000 bushels of grain comprises the fleet en route to Buffalo.

#### PERISHABLE FOOD SUPPLY AT THE PORT OF NEW YORK.

About 426,000 tons or 38,698 cars of perishable foodstuffs, consisting of fresh fruits and vegetables, dairy products and meats, were received at the Port of New York in March, 1929. This is an increase of only about 1 per cent. over the corresponding month of 1928. Receipts of fresh fruits and vegetables, however, again showed a marked increase, rising from 152,000 tons in March, 1928, to 167,000 tons in March, 1929, an increase of 10 per cent. Dressed meats increased by 12 per cent. over last March, dressed poultry by 7 per cent. and cheese by 3 per cent. On the other hand, live poultry declined by 16 per cent., eggs by 12 per cent. and live stock by 10 per cent.

#### WAREHOUSES.

A survey made by service agents indicates that there are within the Port District, as of May 1st, 1929, over 400 storage warehouse companies operating over 1,000 units with a total area of about 36,000,000 square feet. This survey shows 81 additional companies, 91 additional units and 2,328,000 more square feet than was reported as of November 1st, 1928. Most of this increase consists of companies and units which were operating on the earlier date but were unreported. However, in the following six months 6 new units have been added to the storage space of the port with an aggregate area of 373,000 square feet.

The survey of May 1st, 1929, indicates that the square feet of storage space is divided by types, as follows:—

	Total Port District. sq. ft.	New York Section. sq. ft.	New Jersey Section. sq. ft.
Total Storage	35,983,000	27,543,000	8,440,000
Dry Storage—			
General Merchandise	26,967,000	21,272,000	5,695,000
Tobacco	197,000	197,000	—
Furniture	3,886,000	3,164,000	722,000
Cold Storage—			
Foods	4,848,000	2,825,000	2,023,000
Furs	85,000	85,000	—

At the end of February, 1929, the United States Department of Commerce reported that public merchandise warehouses in New York State were occupied to the extent of 52 per cent. of their capacity, and those in New Jersey to 74 per cent. of their capacity. For the entire country, the average occupancy stood at 68 per cent.

The Bronx Terminal Market, built by the City of New York at 153rd and Exterior Streets, was formally opened on May 1st. The storage space in this market is as follows:—

	Square Feet.
Dry Storage	81,000
Egg Storage	62,666
Cold Storage	89,316
Freezer Storage	83,624
Total	316,606

At present this space is available only on a square foot lease basis, and it is not yet being operated as a public cold storage warehouse.

#### NEW GRAVING DOCK LENGTHENED 16 FEET.

By a slight change in design, the length of the big new graving dock at the Robins plant of the Todd Shipyard Corporation has been increased 16-ft. This extension will give the dock an overall length of 745-ft., thus providing docking facilities for liners that have never been able to dry dock in New York before.

Rapid progress in the work is being maintained. The side walls and cement floor on the inshore end of the dock are almost completed, dredging of the 250-ft. outshore section has been finished, timber foundation piling driven, steel trusses and forms lowered and set in position by the divers to receive the cement.

#### PORT PROTECTION.

In keeping with the Port Authority's policy of aggressive action to insure a fair competitive position for the Port of New York, representatives of the Bureau of Commerce appeared before a committee of the Trunk Line Association on May 2nd together with representatives of the intercoastal lumber trade and the Port of Newark in support of a proposal that the carriers absorb the cost of loading cars of lumber shipped on rates exceeding 9 cents per 100 pounds. The railroads now pay the loading cost on intercoastal lumber shipments through Baltimore, Philadelphia and Camden, thereby putting shippers through the Port of New York at a disadvantage in serving such territory as Buffalo and Rochester, N.Y., and Trenton, N.J. The proposal made to the Trunk Line Association would place shipments loaded at Port Newark, Communipaw, Jersey City, Hoboken and Weehawken, the railheads on the westerly side of the Port of New York, on a parity with Philadelphia and Baltimore. Cost of loading cars is already included in New York lighterage rates.

The publication, during the latter part of April, of the report and recommendations of examiners Mackley and Hall in I.C.C. Docket 17000, Part 7, the Hoch-Smith Grain Investigation, is another indication of the soundness of the position taken by the Port Authority with respect to the matter of differentials. The Interstate Commerce Commission examiners recommend that the eastern port differentials on ex-lake grain be abolished, placing New York on the same basis as Baltimore and Philadelphia, the length of haul from lake ports to all three seaboard points being approximately the same. The examiners oppose any segregation of terminal charges, recommending the preservation of shipside rates.

#### PORT INFORMATION.

The Bureau of Commerce continues to handle a number of inquiries relating to transportation service, waterfront sites for industrial locations and movement of commodities through the Port District.

One inquiry of particular interest was from a large manufacturing company desiring to locate within a certain area of the port. This company was advised as to all of the waterfront locations capable of meeting the requirements laid down in the inquiry, showing such details as area, transportation service, floor load and ceiling height of buildings, approximate rental or asking price, tax rates, etc. Arrangements were made for the inspection of such properties as the inquirer thought might take care of his needs.

As a result of reports of congestion in grain elevators and cargo ships at lake ports and Montreal, agents of the Bureau of Commerce investigated the use of grain storage facilities in the Port of New York as of May 1st. Excess capacity of 10,000,000 bushels was found in railroad elevators or grain boats or the New York State Barge elevator.

#### SHIPPING TRAFFIC AT WILHELMSHAVEN-RUESTRINGEN.

Traffic in the Commercial Harbour at Wilhelmshaven-Ruestringen in April is reported to be as follows:—

Incoming: 23 ships with a cubic capacity of 40,447 cubic metres. Outgoing: 24 ships with a cubic capacity of 40,417 cubic metres.

Amongst these, one steamer, 16 sailing vessels (with motor engines) and one sailing ship flew the German flag.

Traffic on Canal Ems-Jade:—

Incoming: 31 vessels with 3,947 cubic metres capacity. Outgoing: 32 vessels with 4,037 cubic metres capacity. All the above vessels were German.

#### CONSTRUCTION OF NEW LOCK IN BREMERHAVEN.

The foundation stone of what is described will be the largest lock in Germany, and only second to the Ymuiden lock in Amsterdam, was laid by Dr. Donandt, the president of the Bremen Senate.

Preparatory work on this lock commenced in 1914. All work was stopped in 1916. Approximately Rm.2,000,000 have been spent. It is estimated that the cost of the lock will be approximately Rm.30,000,000.

It is stated that the construction of this new lock is necessary, due to the accommodation required for such large steamers as the "Bremen" and the "Europa." Construction will be completed in four years, and it is calculated that 1,000 men will be employed. According to present information 25,600 piles will be used for the lock and annexes. 92,000 tons of cement will be required and 27,000 tons of iron. It is stated that 3,000,000 cubic metres of earth will have to be removed.

## Notes of the Month.

### BREMEN SHIPPING TRAFFIC.

During the quarter ended 31st March, 1929, 178 British ships with a net registered tonnage of 278,537 tons entered Bremen harbours.

Comparative statistics showing the amount of tonnage entering Bremen harbours in the months of January, February and March during the years 1914, 1928 and 1929 are:—

	Vessels.	N.R.T.
1914.—January	433	421,994
February	400	372,922
March	471	429,923
1928.—January	449	710,247
February	434	604,600
March	480	742,954
1929.—January	494	793,920
February	340	608,462
March	433	724,915

### TRAFFIC IN EMDEN HARBOUR DURING 1928.

According to the report of the Chamber of Commerce for East Frisia and Papenburg for the year 1928 the harbour traffic in Emden suffered for the greater part of the year from the influence of disturbances.

Although the prospects for the year were not in general unfavourable and showed a large increase in the last three months of the year after the labour difficulties had been removed, the total traffic was less than in 1927. This was also partly due to the stoppage of the canal traffic up to the 18th March, due to a wages strike. Before this was at an end the Swedish iron ore workers' strike took place and lasted until the end of August, causing the imports of ore to drop to a fraction of normal times.

The traffic losses caused by these conditions could not be retrieved in the last three months of the year, which alone were normal.

The shipping traffic was as follows:—

Arrivals, 1928.—2,999 sea-going ships with 1,886,960 net register tons.

Arrivals, 1927.—2,415 sea-going ships with 1,789,499 net register tons.

Arrivals, 1926.—3,236 sea-going ships with 2,707,586 net register tons.

Sailings, 1928.—2,943 sea-going ships with 1,391,283 net register tons.

Sailings, 1927.—2,648 sea-going ships with 1,817,950 net register tons.

Sailings, 1926.—3,323 sea-going ships with 2,743,235 net register tons.

Of the incoming sea traffic 57 per cent. of tonnage was with cargoes, and outgoings 75.47 per cent. The total tonnage of cargoes dealt with in 1928 amounted to 2,857,135 tons in comparison with 3,919,487 tons in 1927 and 4,812,081 tons in 1926.

### STETTIN PORT TRAFFIC IN APRIL, 1929.

Total number and tonnage of sea-going vessels which entered and cleared the port in April:—

Entered.—377 vessels of 530,990 cubic metres net register.

Cleared.—358 vessels of 523,150 cubic metres net register.

Total amount of goods imported and exported by sea during the month:—Imported: 245,000 metric tons. Exported: 200,000 metric tons.

The principal imports were as follows:—

Ore.—54,000 metric tons (principally from Sweden).

Coal.—64,000 metric tons (from U.K. and German coal via Rotterdam).

Phosphate.—15,000 metric tons (from N. Africa and via Antwerp).

Scrap iron.—3,000 metric tons (from U.K.).

Herrings.—2,000 metric tons (from U.K. and Norway).

Soya beans.—9,000 metric tons (from Far East).

The principal exports were as follows:—

Grain.—69,000 metric tons (to Baltic and Scandinavian ports and U.K.).

Sugar.—32,000 metric tons (chiefly to France).

Artificial manure.—11,000 metric tons (to German ports).

Brown coal briquettes.—2,000 metric tons (to Scandinavian ports).

Paper.—2,000 metric tons (to Hamburg for overseas).

Iron and ironware.—1,000 metric tons (to Baltic ports).

### HAMBURG—LOWER ELBE NAVIGATION.

The maintenance of the Elbe from Geesthacht (a few miles above Hamburg) to the sea was taken over by the Reich in 1921, but in consequence of later agreements with Hamburg and Prussia a considerable portion of the river from Ortkathen to Blankenese has been administered by a dual commission composed of delegates of the two States, so that, with the exception of a short stretch from Geesthacht to Ortkathen, the work carried out by the Reich has been entirely confined to the portion of the river seawards below Blankenese. An indication of the work and the cost of the improvements already

carried out may be gathered from the following figures: During 1928, 9.64 million cubic metres of earth were dredged from the river. In addition to the cost of maintenance and administration during 1928, which amounted to 6.6 million marks, the following amounts have been voted for the scheme since its inception:—

	Marks.
Work and improvements on the East Bank	21,500,000
Dredging operations at the East Bank	4,313,000
Preliminary work in the fairway near Pagen Sands	483,000
Regulating the stream at the Pagen Sands	17,500,000
Construction of harbour at Schulau	780,000
Conversion of lights to electricity or liquid gas	100,000
Construction of wireless, air and water signals on "Elbe No. 1," and reconstruction of other lightships at other stations	273,000
Installation of light buoys	156,000
Two pilot steamers	1,300,000
One pilot transport motor ship	400,000
One pile driver and four tugs	650,000
Erection of water gauge at Holstenreck	79,000

### CARDIFF AS A TRANSATLANTIC PORT.

The Canadian Pacific liner "Montrose" made her second call at the Bute Docks, Cardiff, for the purpose of embarking emigrants for Quebec and Montreal, on Saturday, May 4th.

The liner arrived in the evening, entered the Queen Alexandra Dock, embarked about 600 passengers, and sailed again early Sunday morning.

Since the last call of the "Montrose," on April 6th, the Great Western Railway Company have constructed new connecting railway lines at the Queen Alexandra Dock which enabled the special trains conveying the emigrants to run direct to the shed alongside the quay where the vessel was berthed, thus ensuring the utmost comfort and convenience for the passengers.

The development of Cardiff as an Atlantic Liner Port was also advanced a further stage by the Canadian Pacific Railway Company sending a further liner, the "Minnedosa" (15,186 tons gross register) to Cardiff on May 25th.

In addition to the call of this steamer, the United States Shipping Board liner "America" (21,329 gross tons) will also call on 5th September next.

### THE BALTIC AND INTERNATIONAL MARITIME CONFERENCE.

The Annual General Meeting of the Baltic and International Maritime Conference will be held at the Grand Assembly Rooms, Barras Bridge, Newcastle-upon-Tyne, on Thursday, 13th June, and Friday, 14th June, 1929. The meeting commences at 10.30 a.m.

### STANDARD DREDGING COMPANY TO DREDGE 200,000,000 CUBIC YARDS.

According to "Port and Terminal," the Standard Dredging Company has just obtained a contract for the preliminary work on a new airport at New Orleans. This contract will involve the dredging of 200,000,000 cubic yards and brings the Standard Dredging Company \$900,000.

Recently the company also obtained the contract for work on the Secuacus Airport in New Jersey not far from New York City which is to be the largest in the world.

R. A. Perry, president of the Standard Dredging Company, states that the company has under negotiations a number of other airport contracts and some of these should be closed in the near future.

### RAPID PROGRESS ON MONTREAL ISLAND POWER DEVELOPMENT.

According to officials of the engineering division of the Power Corporation of Canada, Ltd., construction of the Montreal Island Power Company's hydro electric plant on the Back River (Rivière des Prairies) seven miles from the City of Montreal, is well up to schedule, and power will be available on or before November 1st next. The coffer dams are now unwatered and the first turbine has been installed. Three of the large generators are completed and work on their installations will begin on June 1st. The power house superstructure for the first six units will be completed by July 1st.

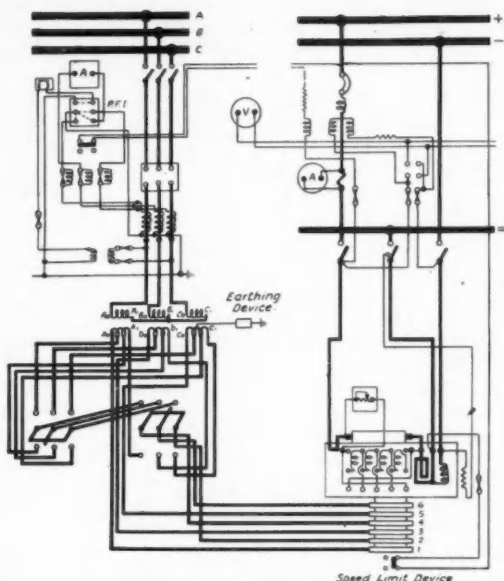
The initial installation will be six units of 12,000 horsepower maximum capacity each, but the ultimate installation will be ten units giving a maximum installed capacity of 120,000 horsepower at a total cost of \$8,000,000. The whole of the power from the new plant is to be purchased for a period of 30 years by the Montreal Light, Heat and Power Consolidated, with provision to extend the contract for a similar period.

## Dock and Harbour Works Electrification.

### Converting Alternating Current from the Public Supply to Direct Current.

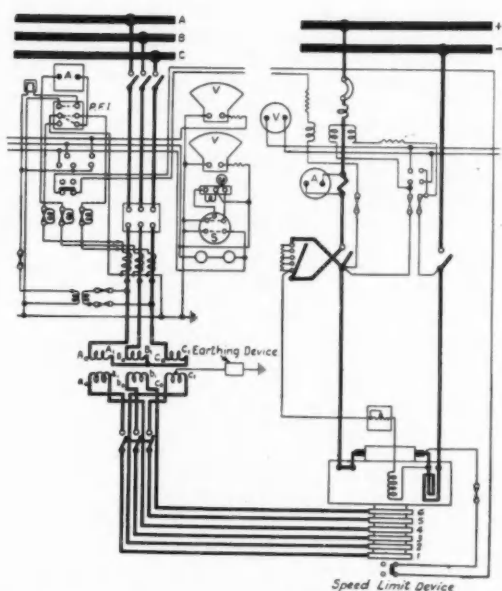
#### I.—ROTARY CONVERTERS.

In most docks and harbours there is a demand for direct current, especially in connection with electric traction lifts, elevators, cranes and machine tools. It is well-known that power cannot be transmitted economically for any appreciable distance with low tension direct current, so that where the



Connections of Rotary Converter Equipment with A.C. Tap Starting. Six-phase, D.C. Side Compound-wound, 2-wire (B.T.H. Co.).

centre of the D.C. distribution is situated at a distance from the generating station, it is usual to transmit by alternating current and convert at a sub-station into direct current. In cases, moreover, where a generating station also has a local D.C. demand it is often the best policy to generate alternating current only, and convert to direct current in the main station for the local D.C. supply. In all such cases it is, of course, necessary to employ converting machinery of the highest efficiency and reliability; and these essentials will be found to be the predominating characteristics of the modern rotary converter. This type of machine, used in conjunction with step-down transformers, provides the most efficient, reliable and simple means of converting alternating current, or vice-versa.



Connections of Rotary Converter Equipment with D.C. Starting. Synchronising on High-pressure Side. D.C. Side Shunt-wound, 2-wire (B.T.H. Co.).

The ordinary type of rotary converter gives approximately constant voltage on the D.C. side with constant A.C. voltage applied to the slip-rings, the D.C. voltage usually dropping approximately 7 per cent. from no load to full load. If the alternating voltage at the slip-rings be kept constant, a par-

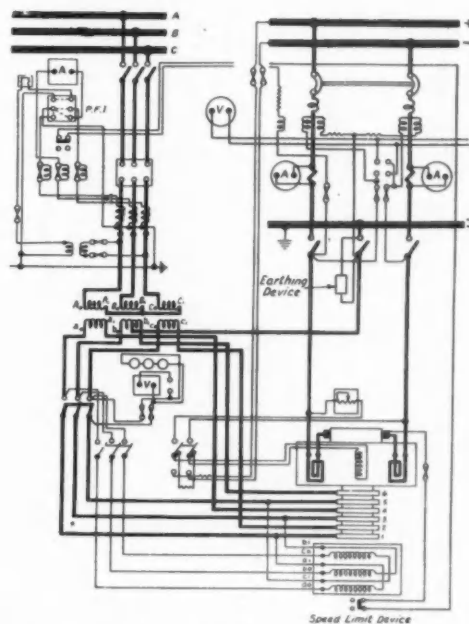
ticular field excitation will give unity power factor at the slip-rings. The amount of excitation is that which would produce the same D.C. voltage in the armature, were the converter being separately driven as a D.C. generator. If the field current be reduced below this value, a lagging current will be drawn from the A.C. mains; while on the other hand, if the field current be increased, a leading alternating current will be drawn.

A rotary converter runs at its highest efficiency and lowest heating on unity power factor. It is, therefore, advisable to adjust rotaries so that the normal D.C. voltage is obtained with unity power factor somewhere between  $\frac{2}{3}$  and full load when the A.C. voltage is normal. If, with the correct A.C. voltage and unity power factor, the D.C. voltage is not high enough to suit station requirements, the field current of the machine should not be increased to obtain the higher D.C. voltage by means of drawing leading current through the transformer or other reactance, but the high tension taps on the transformer should be changed to give a higher applied voltage at the slip-rings of the converter.

It may, however, be necessary to install a rotary to draw leading current so as to compensate for lagging current elsewhere in the system. This result can be obtained by adjusting the high tension taps on the transformers so that the correct D.C. voltage is obtained with leading current. It will be understood that with constant A.C. voltage and varying D.C. voltage, the amount of leading current that can be drawn will vary with the D.C. voltage, except in the case of split-pole, booster or regulator-controlled converters, in which the power factor is independent of load and voltage.

The following methods are available for starting rotary converters:—

- (i) A.C. starting by means of taps on transformers.
- (ii) Induction motor starting, requiring separate synchronising.
- (iii) Induction motor starting, self-synchronising.
- (iv) D.C. starting.



Connections of Rotary Converter Equipment with Self-synchronising Induction Motor Starting. D.C. Side Shunt-wound, 3-wire (B.T.H. Co.).

This is the simplest method of starting from the A.C. side and is one which was adopted in many of the earliest machines. These were started by connecting the slip-rings of the converter to one-half or one-third voltage tapplings in the transformer. The rotary would run up to, and into, synchronism, after which the field circuit could be closed and the machine thrown over quickly to the full voltage.

This method of starting has the advantage of being quick-starting and self-synchronizing, and it is still a satisfactory and economical method for use with small rotary converters. With half taps, the momentary current from the line at starting is approximately full load current, while with one-third and two-thirds taps, the initial current is about 50 per cent. of that at full load.

With this arrangement the converter may run up to speed with its polarity reversed, but this can easily be changed by means of a field reversing switch mounted on the frame of the machine. This method of starting was generally adopted in America, particularly for 25-cycle railway service, but has been little used in England except for small sizes, on account of the large starting current usually required, and the operation of heavy switches entailed thereby.

Moreover, in the case of large machines without commutating poles, while sparking at the commutator during starting was permissible, this was no longer the case on commutating pole designs; and, although D.C. brush-raising devices have been

used to overcome this difficulty, they have not proved to be desirable additions to rotary converter commutators.

The induction motor method of starting was introduced to obtain low starting currents. Objections have been raised to this method as it necessitates synchronizing the rotary; but it was one which was generally adopted in England for some time, and gave good results. This method is suitable for all 50-cycle rotaries running at 1,000 r.p.m. and below, and for all 25-cycle rotaries running at 500 r.p.m. and below. Later, however, a method of starting was perfected combining the advantages of both the previous ones, i.e., induction motor starting and self-synchronizing, and it is this last which is now recommended.

This method of starting is similar to that last described, with the exception that the induction motor stator windings are connected in series with the converter armature at starting. The induction motor starts the converter and brings it up to synchronous speed. At this point the motor acts as a synchronizing reactance and allows the converter to synchronize automatically with the supply through the stator windings of the motor. As soon as the converter has synchronized, the induction motor stator windings can be short-circuited and the converter is then ready for paralleling on the D.C. bus-bars.

Rotary converters can be started from the D.C. side and synchronized on the A.C. side, and the starting current need not exceed 10 per cent. of the full load current. On account of the difference which may exist between the A.C. voltage of the rotary and that of the supply, it is usual to leave some of the starting resistance in circuit on the D.C. side of the converter, until the latter has been paralleled on the A.C. side. This is to limit the load which the machine will take up as soon as it is synchronized. After the converter has been synchronized, this "buffer" resistance is short-circuited by the starting switch.

A large number of machines have been installed for running D.C. to A.C. These have been used to assist the A.C. generators at times when the A.C. system has been heavily loaded; or to run at week-ends on a small A.C. load when it is not economical to keep a large A.C. generator running; or to run continually inverted on a new A.C. supply until such time as the installation of a large A.C. turbo-generator is warranted. For this duty the speed regulation of the converter is quite satisfactory if the machine is provided with an exciter. A speed limit device should also be fitted to prevent the rotary attaining too high a speed, should an excessive lagging current be drawn from the converter, owing to a fault on the A.C. system. Equipments for inverted running require an A.C. booster or induction regulator, so that the A.C. voltage can be controlled independently.

## North-East Coast Notes.

An important and exhaustive statement was made by Mr. Francis Priestman, Chairman of the Finance Committee, at the April meeting of the River Tyne Commission, when he presented the accounts for the past year. A study of the figures, he said, revealed causes for gratification. We had passed the first decade following the conclusion of the war, and that period had been one of industrial vicissitude. For the North-East Coast probably more than for any other area of the British Isles, it had been a period of intense anxiety consequent on acute trade depression. Happily that depression did appear at last to be passing, and they had reason to feel that we were now in sight of greater stability and prosperity. Notwithstanding the extraordinarily depressed condition of the coal trade—the Commission's largest industrial and revenue producing asset—which continued for nine months of the year, they secured a substantial income and had been able after providing for all liabilities to contribute an appreciable sum towards the amount spent on new works.

### CHEAPER LOANS.

During the year loans to the extent of £393,000 running at varying rates of interest up to 6½ per cent., most of it at 5 per cent., fell due. The figure of £393,000 was not striking, except that it was comparatively small, but what was a striking feature was that such was the confidence of the investing public in the Commissioners' securities that no less than 84 per cent. of that sum was renewed, some at 5 per cent. and some at 4½ per cent. In addition to the loans renewed, £240,000 of new money was secured at 5 per cent. It was a matter of interest to know that no portion of the Commissioners' borrowed money carried a higher rate of interest than 5 per cent., and that a substantial proportion was running at lower rates.

The revenue for 1928 amounted to £614,000, a few hundreds more than in the previous year, notwithstanding that discount on the coal dues was allowed. During the year the Commissioners made another contribution towards the rehabilitation of industry by a discount of 10 per cent. on the export dues of coal and coke. In a full year that would mean a reduction in revenue of about £12,000, and would bring up the total amount

of concessions made by the Commissioners since 1922 to over £1,600,000.

In the trade of the port the outstanding and gratifying feature was the increased volume of coal and coke exports. If it was not a great increase it was still welcome, and he thought significant. Welcome because of the increased additional revenue, and significant because it might be that it heralded the return to them of a larger share of the world's markets.

### EXPANDING COKE TRADE.

Perhaps the most striking feature of their mineral export trade was the large increase in coke shipments during 1928. In 1913 the export was just over 300,000 tons. By 1927 it had risen to over half a million tons, but in 1928 an export of 850,000 tons was reached. A truly remarkable development of the trade since pre-War days, and a worthy tribute to the enterprise of their local manufacturers. From knowledge which he had it was not unlikely that even the 1928 volume would be left behind this year. The increased coke shipments were all overseas (the coastwise trade being not quite so good as in 1927), Germany, Italy, Scandinavia, Canada, United States, Philippines, West Indies, and Rumania all having taken substantially greater quantity than in 1927.

### WEEK END COALING HOURS.

No mention of their coal export trade, Mr. Priestman continued, would be complete without some reference to what he thought they might consider the most important and valuable local trade event of post-war years—the securing of greater elasticity in working hours at week-ends in the shipment of coal. As a result of protracted and difficult effort they were successful in securing that work might be continued in the Tyne until ten o'clock on Saturday nights when necessary in order that ships might be enabled to sail. That saving of detention in port over the week-end was of incalculable value to the shipowner. Since the extension came into operation in the middle of December up to the end of March, nearly 300 vessels, with a total loading of over 700,000 tons had been completed in the Tyne after noon on Saturdays, and had sailed on Saturdays or early on Sundays. It was impossible to gauge the value of the extended hours; it was, he thought, the simple truth that probably a number of those ships would not have come to the Tyne at all but for the extension of working hours.

A comparatively new trade to the Tyne was the import of petroleum spirit (petrol) in bulk. They had had some in 1927—a small quantity brought in by coasters—but in 1928, with an extension of storage facilities, imports had come along in ocean-going steamers and in much larger quantities. The imports last year were 30,000 tons, representing about 9,000,000 gallons, and from the information which they had he thought the trade was likely to grow.

### BLYTH'S COAL RECORD.

The coal trade at Blyth has been steadily expanding all this year and by the end of April had created a new record for the port. The figures for the first four months of the year showed an increase of 18 per cent. on last year and 6 per cent. on 1927, and 17 per cent. more than in 1913. The respective totals were:—1929, 1,780,533; 1928, 1,511,191; 1927, 1,683,468; 1913, 1,518,810. The imports of timber also showed an improvement, and for the first three months were better than for some time past.

The Wear Commission have decided to replace Hendon Bell Buoy, which has been wrecked, at an estimated cost of £500. They also accepted the tender of Sir William Arroll and Company of £3,157 for foundations for a steel structure in connection with a new staith to be erected at the docks.

The largest vessel ever launched from the Tees shipyard left the stocks of the Furness Shipbuilding Company at Haverston Hill at the end of April. The vessel is the *Athelcrown*, a 16,000-ton twin-screw motor tanker, which has been built to the order of the United Molasses Company Ltd., for the Java service. The *Athelcrown* has also the distinction of being the largest and fastest in the rapidly enlarging fleet of the Molasses Company who have recently placed an order for a sixth vessel of about 13,000 tons with the Furness Shipbuilding Company. The principal dimensions of the *Athelcrown* are: Length 546-ft. 9-in., beam 68-ft. 10-in., depth 39-ft. and draft 28-ft. 6-in.

April shipments of pig iron from the Tees are the heaviest for three years and aggregate loadings of pig iron, manufactured iron and steel last month were the largest for two years. Pig iron manufactured on Teeside is finding its way to destinations that have not drawn supplies from the Middlesbrough district for some years. Official returns give last month's total clearances of iron and steel from the Tees at 96,912 tons, comprising 30,101 tons of pig iron, 5,931 tons of manufactured iron, and 60,880 tons of steel.

### OBITUARY.

Mr. W. H. Parkinson, who had been associated with Newcastle Quayside for more than 60 years, died recently at Horn-castle where he had gone to spend a few days' holiday. He had been connected with the Londonderry Collieries at Seaham Harbour and, later, with the Harton Coal Company, only retiring from his business activities a few years ago.